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AMATEUR RADIO, AUSTRALIA'S WINDOW ON THE WORLD

SUGGESTED RETAIL
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FOREWORD

This book sets out to give you a wider glimpse of amateur radio, and should assist the beginner to understand why amateur radio possesses the fascination it does to so many people from all walks of life.

The original thought was to produce a Wireless Institute year book, but other commitments prevented this. The happy thought came forward that more might be achieved if the purchaser could see the kind of monthly journal produced for the members and distributed to them free as one part of the benefits of membership.

Although the book is a modied version of the regular "Amateur Radio" magazine, the style of presentation and most of the regular features have been retained and various articles specially prepared for those wanting to know more about amateur radio.

I commend this book for serious attention.

Melbourne
December 1977.

D. A. WARDLAW VK3ADW,
WIA Federal President.

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President — Mr. T. I. Mills VK2ZTM
Secretary — Mr. I. A. Mackenzie VK2ZIM
Broadcasts— 1825, 3595, 7146 kHz, 28.5, 52.1, 52.525, 144.1, Ch. 8 and other relay stations: 01.00Z. (Also Sunday evenings 09.30Z and Hunter Branch, Mondays 09.30Z on 3570 kHz and ch. 3 and 6).

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VK6 — G.P.O. Box N1002, Perth, 6001.
VK7 — P.O. Box 1010, Launceston, 7250.
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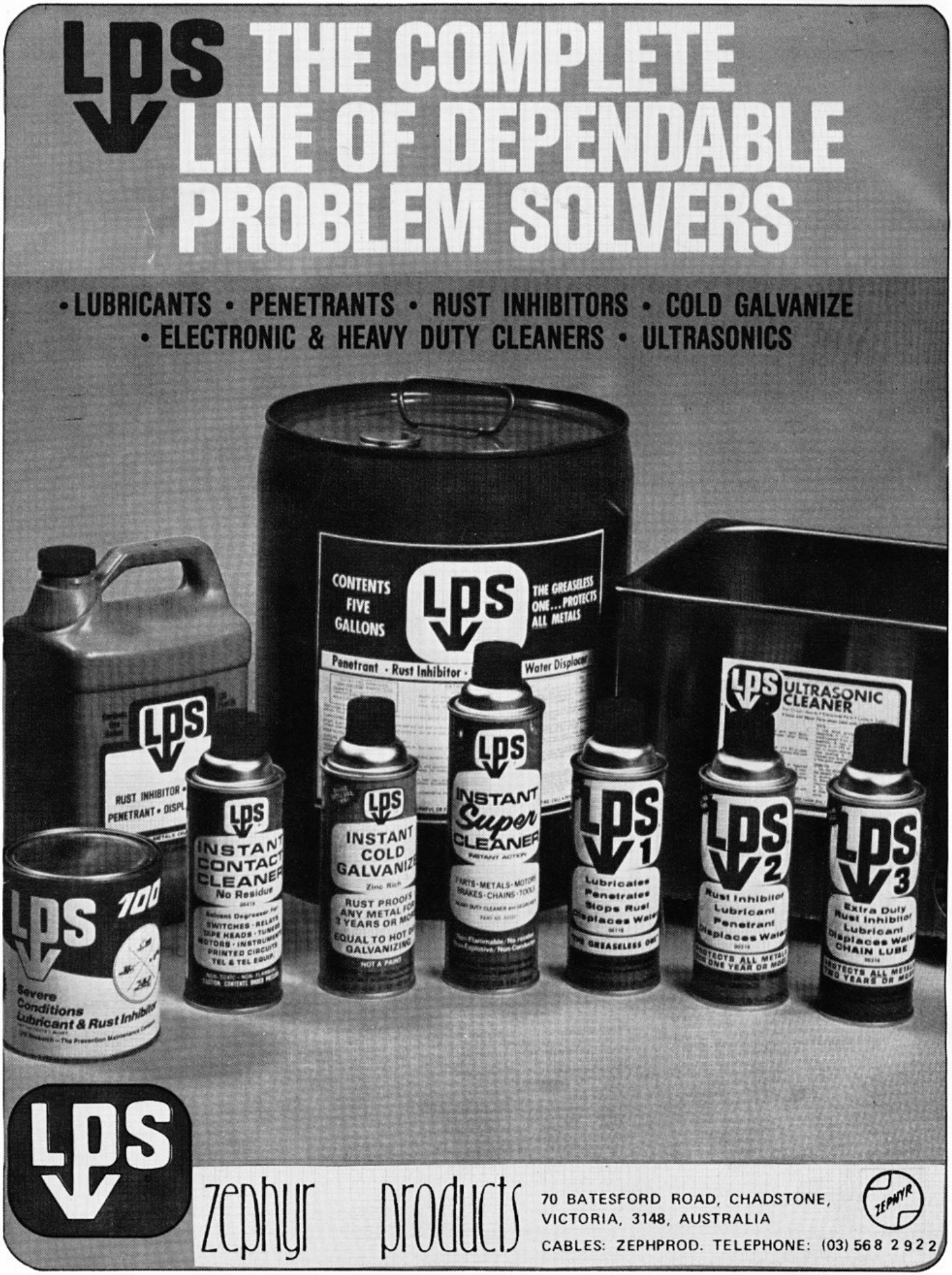
Slow morse transmissions — most week-day evenings about 09.30Z onwards around 3550 kHz.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WIANEWS

PUBLICATION DELAYS

The power restrictions in Melbourne during October have affected AR. Delays in type-setting, printing and addressing will affect distribution through into the New Year.

1977 CALL BOOK

The Call Book is virtually out of print, although individual copies may still be obtainable at technical bookshops and amateur equipment suppliers.

EDP

The October meeting of the Executive decided upon various changes affecting the computer programme after investigations had been made of commercial operations.

NOVICE EXAMINATIONS

The Federal Education Co-ordinator advised that the Novice exam syllabus submitted to the P. and T. Department was generally quite acceptable. Official comment is delayed through pressure of work. It was considered that various topic areas should be included in the syllabus at a very basic level to permit simple questions being set in the Novice exams. These topics were FM, frequency measuring technique, transmission lines, pulse modulation, CROs, 3-element yagis, receiver sensitivity figures and basic knowledge of VFOs.

In relation to Novice Morse exams the proposals from Roger Davis VK4AAR suggesting faster-sent characters and greater-length spacing to improve the intelligibility of 5 w.p.m. Morse has been favourably received by the Department.

2m REPEATERS

The Department has been advised of the newly WIA approved 2 metre band additional repeater channels.

NSW YOUTH RADIO SERVICE

Rex Black VK2YA, reports the Management Committee is rapidly reaching the end of its mammoth task of producing 1000 Novice questions. Sets of 50 questions will be available on five different topics. Details available from their Education Officer, David Wilson VK2ZCA.

YRS activities are not restricted to school age youngsters. Many of the YRS-registered clubs contain "student" members of quite mature years, including father and son combinations attending for Novice training. A large part of the YRS elementary courses for YRS certificate awards cover the Novice (proposed) syllabus.

Students of school age who gain these awards will find them useful when applying for employment in allied subjects as demonstrating a continuing interest in radio on a serious and systematic level.

Further certificate courses are available for telephony and telegraphy as well as Regulations to ensure learning and applying correct procedures. These courses include the availability of Morse tapes.

The trial Novice exam project introduced by NSW YRS has proved to be of great help to prospective Novices. This has also been the experience in Victoria. A Novice instruction kit has been prepared to make the instructional task much easier at club level — possibly similar to the package available in VK4. The price is only $12 to Class Instructors. Contact VK2ZCA, Ph. (02) 621 2763.

RON WILKINSON AWARD

The Federal President and the Executive Vice-President visited Mrs. Mary Wilkinson, widow of the late Ron Wilkinson (VK3AKC), early in October for discussions about the kind of award she favoured as a memorial. Mrs. Wilkinson has donated $1,100 towards funding this award and this was most gratefully received.

GENERAL

Mr. Peter Wolfenden VK3ZPA, the Federal Vice-President, has agreed to represent the Federal body of the Institute at the Eastern Zone Convention in Leongatha towards the end of November. ■

AMATEUR RADIO AND THE COMMUNITY

A member of the public could become aware of amateur radio in several ways. Public displays, Scouts' Jamboree-on-the-Air, or even through school radio clubs. Occasionally he might read about it in the press, although journalists still delight, erroneously, in lumping together as "ham radio" all radio activities by private persons.

But in more subtle ways the existence of amateur radio could come to notice in less pleasant ways. Either because a neighbourhood garden might suddenly sprout a tower topped by a beam aerial or by way of interference to the television or radio receiver or to an electronic item of equipment such as a hi-fi system or tape recorder.

Many people regard a tower with its beam as detracting from the amenities of the area thus causing an alleged reduction in property values. This has never been satisfactorily substantiated at community levels partly because people have become so accustomed to the real eyesores of the countryside such as power distribution apparatus that they never take them into account and partly through lack of knowledge of the benefits of amateur radio to the local community.

These benefits, however are well recognised at national and international levels. The literature on the subject is considerable but a quotation from a judgement handed down by the Town Planning and Appeals Tribunal of Victoria illustrates this recognition:—

"It seems to us that an amateur radio station conducted as a hobby in and from a detached home would be part of the normal use of such a house. We do not think a planning permit for the proposed mast is required though a building permit under the uniform building regulations would of course be necessary. Whether or not a permit is required we are, however, of the opinion that the proposed mast would have very little effect on the amenity of the neighbourhood and any slight adverse affect which it may have, is in our opinion more than compensated for by the community benefit given by this radio station." (Appeal X74/1023 of 14/4/1975 in re a 43 ft. radio mast with antenna at the top in area zoned "Reserved living" in Vermont South, Victoria.)

Amateur radio benefits the community in a number of less obvious ways, including the ability of radio amateurs to provide radio communications in emergencies and disasters and the intense interest taken in training courses and demonstrations for the benefit of students and others. Some young men and women seek a career in electronics and allied subjects for which there are fewer better ways of making a start than through amateur radio. Others seeks to enlarge their interests by providing themselves with a first class leisure activity, available to the young and old alike, to commoners and Kings, to labourers and professional people of all descriptions, both in the western and eastern parts of the world.

Amateur radio has flourished ever since electromagnetic wave communications were discovered and fired the imaginations of the pioneers. The Wireless Institute of Australia in fact traces its lineage back to as long ago as 1910. The first of its kind in the world. Although rapidly overtaken in numerical strength later on by many other countries such as the USA, Russia, Britain, Japan, Argentina, West Germany and others, Australian amateurs do not lag behind their counterparts elsewhere in technical and other achievements.

Strange as it may seem, amateur radio cannot confer any financial benefits on its followers. This is expressly forbidden in international and local laws.

The prospective radio amateur must put in a fair amount of study to qualify for a licence. Yet another international and local requirement — he must qualify himself and pass examinations before being granted a Government licence to operate transmitters. In Australia the licensing authority is the Radio Branch of the Postal and Telecommunications Department, quite often confused with "Telecom", which is an entirely different organisation.

There are several reasons why radio amateurs are required to achieve certain technical standards. One of the more important is a working knowledge of interference to other services and how to minimise or prevent this occurring.

It is a sad fact of life that any receiving equipment making use of the radio spectrum is susceptible to interference of many kinds — thunderstorms, unsuppressed electrical machines, including internal combustion engines and radio transmitters, to name only a few. It is also a sad fact of life that television and radio receivers slowly deteriorate with age and use. When new a good receiver would have had adequate gain at the operating frequency a year or two ago to have caused little but the very strongest interference from penetrating through to its sound or video outlets. And the same applies to TV aerials, etc. In a high percentage of cases, even today, there is little or no inbuilt protection against interfering signals even though these precautions would be relatively easy and cheap to be incorporated into the design.

Radio amateurs, having received training in interference matters and possessing, through Wireless Institute sources or directly from their own reference books, access to a very large range of technical literature on the subject, appreciate the complexities surrounding the problem. A cure in one case is useless in another, an easily installed and cheaply constructed external unit succeeds in nine cases out of ten, perhaps a good clean-up of the receiver's aerial connections may be all that is required. Whatever is deficient or ineffective can soon be discovered and righted if the owner of the receiver is willing to co-operate in finding a cure. Only in the most stubborn cases is it necessary to go to the expense of calling in an expert.

Unfortunately many owners of receivers refuse or fail to co-operate and seek some other answer to the problem such as complaining to the Radio Branch or to their Member of Parliament. The former can investigate and give advice, given time. The latter already have enough problems of their own to solve. Taking an interference matter out of the technical sphere into the socio-political arena seldom achieves very much except out of pocket expenses. Radio communication is full of complexities and technical compromises especially where consumer products are involved. That bargain receiver attached to a good high gain aerial as demonstrated in the local discount store might be most attractive until it is installed at home in an environment not quite so effective in reducing the incidence of interference. Caveat emptor, as they say!

In summary. Amateur Radio has been in existence since the beginning of this century. Radio amateurs have knowledge and experience in many fields. Their leisure activity is international and under strict controls. If amateurs do not self-regulate their activities they stand to lose their licences — few, if any, would want this to happen to them. Amateur radio has to be carried on without individual pecuniary gains of any kind.

Amateur radio in all its many facets thrives — to the tune of nearly a million persons all over the world. ■

AMATEUR RADIO ACHIEVEMENT AWARD

A new Award for Australian Amateur Radio Operators is about to be established.

This is to be a very special Award — one for achievement.

It has been made possible by the generosity of Mrs. Mary Wilkinson in memory of her late husband, Ron VK3AKC.

The Award will be funded from the interest obtained from a $1,100 donation by Mrs. Wilkinson.

It is anticipated that the Award, which is to be made annually, will know no bounds in Amateur Radio.

Further details will be published as soon as negotiations have been completed.

TIME

By R. L. Freeman — Reviewed by Peter B. Dodd VK3CIF

An article on "The Science of time and its inverse" in the ITU Telecommunication Journal February '77 sets out much detail relating to the measurement of time and how the various systems have developed since ancient times.

The primary building block of time, the second, has required in recent years, definitions and methods of achieving greater and greater accuracy — as, for example, space exploration requires stabilities of the order of 100 nanoseconds. Celestial navigation for ships requires accuracies of the order of 100 milliseconds. The time measured on the basis of orbital movements of planets, the moon and other planetary bodies is called ephemeris time (ET). The earth's orbital motion about the sun is used as the standard to define the numerical measure of ephemeris time.

The sidereal year can be defined with sufficient accuracy, as the average time required by the true sun to make a complete circuit of the ecliptic. It is the period of rotation of the earth (this is not uniform because of tidal retardation which is accompanied by a variation of the orbital velocity of the moon, a movement of the poles varying the position of axis and other irregular variations attributed by some to solar activities) or the diurnal motion of the stars. The sidereal year is given as 365 days, 6 hours, 9 minutes and 9.5403 seconds as compared with the tropical year of 365 days, 5 hours, 48 minutes and 45.9754 seconds.

Universal time (UT) deals with the alternation of day and night or the apparent diurnal motion of the sun. Sidereal time can be easily converted to UT but the conversion of either of these to ephemeris time is not so straightforward. However, ephemeris time has been chosen to agree as nearly as possible with universal time during the 19th century and the two will differ by only a few minutes in the 20th century.

1900, 0 January, Greenwich Mean Noon (i.e., 31.12.1899 GM Noon) is properly designated 0.1.1900 12.00h ET as beginning the fundamental epoch. The tropical year has 31 556 925.9747—5.30T ephemeris seconds where T is in centuries measured from 1900. Multiplication of the inverse by 86 400 gives the UT day. However UT is itself subject to corrections; UT or UTo being the deduction directly from observations, UTI being UTo + p where p is a correction factor for polar motion and UT2 introduces further corrections. The marine navigator is satisfied with the accuracy obtainable from using UT1 time.

When extreme precision is required all these time scales are prone to error. The time scale derives from the quantum phenomenon of the Caesium-133 atom, its transition frequency being 9192.631770 MHz. This gives a more precise time interval but for the exact time of day or date a formula is required to convert to UT or ET. In 1960, a universal co-ordinated time (UTC) was instituted, agreed internationally and was to agree with UT2 to within one-tenth of a second subject to an offset to allow for UTC running slow compared to atomic time early in this decade. The CCIR adopted a new UTC system effective from 1.1.1972 in which all clocks in this system operated at zero offset.

A description is given relating to time and frequency standards ending with the comment that comparison and synchronization of time at a distance provides one of the most ticklish problems in the science of time. Propagation delay for real time shows that approximately 3 microseconds per kilometre is a good yardstick. Thus a user 1000 km distant from a time source transmitter can expect to receive the leading edge of a timing pulse at the receiving antenna 3 ms later than it was launched at the transmitting antenna — assuming ground wave on great circle path. Skip in the ionosphere can account for 400 ms of uncertainty in HF timing dissemination systems. Descriptions then follow on the two radio navigation systems used for continuous time/frequency service information — namely OMEGA on about 10 kHz and LORAN-C at around 100 kHz — and basic satelltie systems. The US Navy's transit navigation satellites provide good time dissemination facilities. Navigation fixes are made by careful measurement of Doppler shift of a 400 MHz signal transmitted from the satellite in conjunction with an optional 150 MHz signal for greater position fixing accuracy.

Departing from the article, Greenwich Mean Time is known as time zone Z. British Summer Time is one hour ahead of GMT. Three hours ahead of GMT is Time Zone "C", Eastern Australian Standard Time (10 hours ahead) is Time Zone "K", and so on. New Zealand is two hours ahead of EAST. For contests and interstate affairs the recommendation is to use GMT, as for example 01.00Z. Many people keep their log in Z. ■

WHAT EXACTLY IS ELECTRICITY?

Alan Shawsmith VK4SS
35 Whynot St., West End, 4001

Every reader of this magazine will know something about electricity. Most of us are not physicists but we're Hams. We all fiddle with the stuff in a variety of ways each time we build gear or switch on the rig: no matter if it's AC, DC, LF, HF, VHF, UHF or whatever — it's still electricity.

Yes, I'm sure you all know what it is. Suppose it was listed as a question in the AOCP exam, "Write a short simple explanation, one page or less". Easy, huh! O.K., take up pen and paper **now,** and go to it. Remember, the criteria is that it be in simple terms; you should do it in ten minutes — or quarter of an hour, or maybe half an hour, or — well, how'd ya go? Not so good, eh!

"What **exactly** is electricity?" is a question that people repeatedly want to pin on to me. If it comes from a group of juveniles, it's no good replying, "You'd better ask a physicist!" Their response would be a silent glance amongst themselves — they assume I don't know. It seems a straightforward simple question to them, so they expect a reasonably simple answer. I usually start out fairly well but soon stumble to a halt, my lower clapper sorta hanging loose on my chest.

If you're well known in the neighbourhood, it's likely you've been approached by schools, teenage clubs, groups, etc., wishing to visit the shack and find out what AR's all about. Most youngsters file in with a look of awe on their faces — but, don't be fooled, in this the electronic age, they ask awkward questions.

After turning on the rig and making a QSO, I usually pass around some DX QSLs, point out on the wall map the countries they represent and then, for openers, go into a routine about propagation paths and iono bounce, etc. This always proves to be a good talking point —but, in most groups, there are always one or two dead keen types (future back roomers), who want to get down to the nitty-gritty of the works of the rig. Finally, the same old familiar question is asked, "Mister, what **exactly** is electricity?". Well, it's no use going into a spiel about coal that fires up the engine, that drives the powerhouse generator, that brings electricity into the shack, etc. Sure, kids need the simplest explanation possible but not that simplistic, which describes where it's at and comes from, rather than what it is.

Well, how do you clearly describe electricity to the enquiring but immature mind? The following is the best I can do, off the cuff. "Electricity comes from the electron: electrons make up the outer layer of an atom and have a small negative charge: they are terribly tiny, about ten billion billion working together are needed to glow an average light bulb. In order to produce electricity, it is necessary to pry loose the electrons from their atoms and get them all to move in the same direction. This is called current or electric current. Certain atoms have their electrons removed more easily than others: these atoms are the best conductors of electricity; the atom that makes up copper being one of the best examples. The trick is to jolt these electrons free from the attraction of their atoms — just like a good hard tackle jolts the ball free from the grip of a footballer. This is done by applying a voltage to the circuit: this voltage can be produced by chemicals such as those contained in a wet, or dry battery, which causes the electrons to move in one direction only (direct current). Another way of producing a voltage is by means of a generator, such as those used in a powerhouse. Basically, a simple generator is a coil rotating through a field around a magnet. As the coil rotates, so the electrons move to and fro, in any circuit connected to the ends of the coil (alternating current). Why electrons break free from their atoms when a voltage is applied to a circuit is not clearly understood. This happening is perhaps best described as being in the nature of things. It might be said finally that electricity is electrons in organized motion, in matter of suitable conductivity."

The above short attempt leaves a lot unsaid and unexplained but the description can be enlarged further by questions from those to whom you are speaking (you hope).

My YF works as a librarian at the local school. Each lunch-hour a small nucleus of kids habit the library, in search of ever more knowledge. Eventually, the inevitable question had to come. Arriving home from work one day, she announced, "Young Johnny Watts asked for a book on electricity, so I told him to drop by after dinner and you'd explain it all to him".

When I testily replied, "Why me?" she looked up in astonishment. See what I mean! Still, I suppose it's nice to be regarded what one is not — electronically.

About an hour later, the lad in question arrived. "Well, young Watts, what's on your mind? You want the good oil on the good herbs," I said, trying to make a friendly start by way of a weak joke.

No response showed on Johnny's dead pan dial. "Oh no, Sir," he said, "I already have a substantial knowledge of oils and herbs. My father is a naturopath."

Just for a moment I thought his reply was a have-on comeback. "Really," I said, wondering how substantial was his "substantial".

"It's the **exact** nature of electricity I wish explained."

"Sure, I'm a little foggy t-- er, we'll do our best. What do you know of physics and the atom?"

"Quite a bit, sir."

"Yes, that's what I was afraid of," I mumbled to myself. About an hour later, J. M. Watts departed, looking slightly disappointed. It had been an hour similar to taking an oral electronics test. Every comment made, J.M.W. had stopped me with a "why?" or "could that be proved?" or "enlarge on that, please sir". Those who've been through it will know what I mean.

I sank wearily into the shack chair and reached for the nearest magazine. An article in it under a heading "The Great Atlanctic Cable" immediately caught my eye. It read, "In 1886, two transatlantic cables were laid between Ireland and Newfoundland, the round circuit being 3,700 miles. To test the cable, a man named Clark, in Ireland, borrowed an ordinary silver sewing thimble; he poured into it a few drops of acid and added a fragment of zinc, thus creating a miniature single cell battery (probably only 3 or 4 volts or less). Using this minipower, he was able to pass enough current through the entire 3,700 miles of cable, to cause a full and clear deflection on a mirror-type galvanometer. The small thimble and a section of the cable are now on display in the Science Museum, South Kensington, London."

I read it twice and began to ponder on the profundity of it all. A drop of potential of 3 volts was enough to jolt electrons loose from their particular nucleii and start them marching in unison and over a distance equivalent to that from Melbourne to S.-E. Asia. It was incredible and more of a miracle than working LP DX on one watt QRP.

Just then my son appeared, holding one of the presently popular 100-1 electronic kit sets, which seemingly make an endless number of gadgets with a minimum of parts.

"Dad?"

"Yes!"

"I've built everything in this kit, twice over — and I've studied the book. I **did** most of the theory in it, like resistance, current, Ohm's Law, you know — and then it says, "the 9V battery makes the electron flow" — what's the electron flow?"

"That's the electrical current."

"Well, what **exactly** is electricity, Dad?"

I continued to gaze at the magazine. I wasn't going to get into that subject matter twice in two hours.

"Dad?"

"Look son," I said finally, "what say you ask me tomorrow, after lunch?"

"Why ,are you too tired right now?"

"No!"

"Then you don't know."

"Yes, I do know." The fateful day was close, when he, like all sons, see their Oms, not as a hero, but just as is — and I wanted to preserve my halo a little longer by being a little better informed on the subject."

"Well, why can't you tell me now?"

"Because I've an appointment with a physicist in the morning." ■

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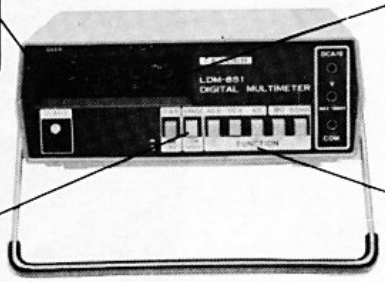

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SOMETHING ABOUT RADIO AMATEURS

Anonymous

Amateur Radio. Seems an unromantic name for quite one of the best of the leisure activities. The old guard in the USA still persist in calling it "ham radio".
What is the fascination about it for radio amateurs? This is hard to answer in a few words because there are so many aspects of the activity which appeal to different people in different ways at various times.

Perhaps the traditions of amateur radio sound a bit dated but they have stood the test of time. Because it takes effort to get a licence it has more value than something you merely buy or pick up in the street. Why waste the hours of study to pass the exams if you do things later on which put your licence in jeopardy. Take pride in your chosen hobby.

There is another reason why radio amateurs value their licence. The activity has so much to offer why jeopardize your own enjoyment on account of other amateurs being on their guard if you do not conform to good behaviour. All of us know how many examples of people pirating amateur call signs — all because amateur radio is such fun. Unfortunately there are plenty of ignorants about the place wanting to spoil a good thing. Envy?

What is so good about amateur radio? The "CB" explosion goes some way in answering this. Communicating with others in an acceptable environment. When you are lonely, bored or have nothing else to do. The rules of the game allow radio amateurs to contact other radio amateurs anywhere in the world. It's an international service with standard basic rules in all countries. These create an immediate common interest. But, in fact if you make contact in Morse (CW) you can get along quite well even if the two of you have no common language. Identification of call signs, signal reports and Q code are internationally recognised and mean the same in English, Russian, Spanish, etc. Seven in Morse code signifies the numeral seven whatever word you use for seven. CW is still the easiest and most penetrating mode of radio communication.

Perhaps it is the modern trend to use the microphone as soon as you get your licence and rig. But there are also many radio amateurs who use the Morse key exclusively. Do some listening in the lower frequencies of the amateur bands — the exclusive CW segments. It so happens I use SSB myself but I recognise the value of CW to the amateur service and its future — even after 30 years of exclusively speech contacts. Perhaps it is my loss for not also trying RTTY, ATV, EME, Meteor scatter or satellite contacts or even VHF. Unfortunately there are only 24 hours in each day and the pocket has never been too deep. Have I lost anything in never having operated through a repeater?

No, speech contacts on HF have given me all the pleasure (and disappointments) I ever needed. For many years I built my own transmitters, the next "better" than the last one. When the pressures of the 24-hour day started biting, there was little option but to buy commercial equipment.

Becoming well known through contacts on the HF bands brought many friends in far away places. Yes, you make many friends on the air. Some you think you will never meet, but who knows what the future holds in store? Do you know anybody you could turn to in an emergency in London, Paris, Athens, San Francisco, Quito, Madras or Tokyo? And your overseas friends say "Yes, I know someone in Melbourne".

For every new contact you would like to exchange QSL cards. You collect cards for awards. Maybe simple awards at first, such as working all continents. Then progressing to working 100 countries, 200 countries, all USA States, 1000 prefixes, all six amateurs in Lagos, and so on. The list is very long. Maybe it takes you six years to get a contact in the Azores and another ten to get an Azores QSL card! That's all part of the game.

Perhaps you will never contact anyone in the Azores. Yet, if you could speak a little Portuguese you could work a CT2 in a few weeks. On CW you might do it in a few days. If you want to learn a foreign language, amateur radio could be the next best thing to living in a country.

But all this pre-supposes your signals can reach into far away places. This requires knowledge and work, and money if you buy fancy beams and other aids. You can roll your own though — the amateur reference books give you all the details you will ever need. The well known quad is most effective and could cost you little more than some wire, a few bamboos and a pole.

Remember though, you will never work the DX if you can't hear them. And furthermore, you'll never hear anything if you do all the talking and no listening. Most of the top DX men do about ten times more listening than transmitting.

Then again, you will hear amateurs on the 40 or 80 metre bands keeping "skeds" with close friends every morning — keeping in touch. Perhaps some of these amateurs never switch on their rigs for any other purpose except, perhaps, to join in the RD Contest every August.

Others take great interest in contests. Almost every week-end in the year there is a contest aimed at world-wide participation. Some avid DXers actually travel to places like uninhabited reefs which are far enough out in the ocean to count as separate "countries". Once ashore they set up their equipment and get on the air to give world amateurs a chance to work a really rare spot. On such occasions the QRM is 10 or 30 deep — CB QRM on 27 MHz has nothing on these pile-ups which are, however, reasonably orderly. The bloke in this "new country" will be operative for a few days at the rate of two or three contacts a minute as long as the bands are open. Just imagine writing and mailing 10,000 QSL cards for such an operation for a multi operator multi station DX-pedition.

There are also DX-peditions to real genuine countries which have few or no amateurs — Andora, Lichtenstein, Anguilla, Tahiti and so on. Or an amateur might be transferred in his work to a country where amateur radio may have been poorly represented for a considerable period of time — Mongolia, Madagascar, Falkland Islands.

With the world starved for such rare ones it is quite an art to have even a short ragchew. By and large, though, there are plenty of countries possessing enough amateurs for the novelty of DX to have worn off. Even today there are USA amateurs who have never worked Australia. There is an unceasing striving after sheepskins (awards) and wallpaper (QSL cards) everywhere in the world. One would think that after several years amateurs would tire of these efforts. Not at all. There are many radio amateurs still going strong after 30, 40, 50 years. Some may be in their 80s or 90s. Real OTs (old-timers).

Others may be blind amateurs or permanently disabled happily rag-chewing all day as long as a band opening lasts. There seems to be no records kept of the longest unbroken QSO — certainly many hours' duration. What subjects? You name a permitted subject and it will be discussed — especially technical matters. How to get that last ounce of "juice" up the "spout", how to "fire" a signal in the right direction at the proper angle of radiation long path or short path, how to beat the QRM. Then you might find the other bloke is also interested in stamp collecting, or wanting to find out about your country as you want to find out something about his, maybe like yourself, he is a computer expert or plays football or is a "real nice guy" interested in all kinds of things.

Sooner or later you will run into nets. Just ordinary nets for people to keep in touch, like SEANET or missionary and other specialist nets, or ad hoc nets to work a rare one or even to play chess over the air, or once a year to play host to Scouts in Jamboree on the Air, or . . . And when you've gone through all the changes you'll suddenly run into a QRP (low power) bloke who refuses to use more than one Watt in power output, or another bloke who works mainly on the higher frequency bands and keeps a receiver

running on beacon frequencies to alert him to band openings. It will not be too long before DX can be worked through Phase III of the amateur satellites.

The list is endless. You keep broadening your interests until one day you settle down to specialise in the things you find the most interesting. How does Shakespeare put it — "There's more in Heaven and Earth, Horatio, than was dreamt of in your philosophy" — or something like that.

And what is it all about? It is about *you*, my friend. Amateur radio is the only *world-wide* service catering for *you* as an individual person. The international definition says that amateur radio is a service of self-training, inter-communication and technical investigations carried on by amateurs. Amateurs (in every country) are duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Oh yes, and you can learn to be a radio amateur as a stepping stone to other things, such as a career in electronics. But that is another story. ■

AMATEUR ABBREVIATIONS

Many abbreviations are in common use in amateur radio (including Hamads). A short list is presented here — punctuations omitted. Note use of capital letters (in some cases optional).

A — Ampere (Amp)
AC, ac — Alternating current
AF, af — Audio frequency
agc — Automatic gain control
AH — Hamads — at home or private number. After hours
ALC, alc — Automatic level control
AM, am — Amplitude modulation
AMSAT — The Radio Amateur Satellite Corporation
anl — Automatic noise limiter
AOCP — Amateur Operator's Certificate of Proficiency
AR, ar (s) — Amateur radio (service), Amateur Radio magazine
ASCII — American Standard Code for Information Interchange
ATV — Amateur television
avc — Automatic volume control
balun — Balanced to unbalanced transformer
bc — Broadcast
BCD, bcd — Binary coded decimal
bci — Broadcast interference
BFO, bfo — Beat frequency oscillator
bit — Binary digit
Bus — Hamads — business or working hours, office hours
CB — Citizens band
CCIR — ITU — Comite Consultatif International des Radio communications
Ch — Channel
cm — Centimetre
coax — Coaxial cable
CRO — Cathode Ray Oscilloscope
CW, cw — Continuous wave, carrier wave (Morse)
dB — Decibel
DC, dc — Direct current
DX, Dx — Distance (relative)
EHF, ehf — Extra High Frequency (30-300 GHz)
EHT, eht — Extra High Tension (V)
EMC — Electromagnetic Compatibility
EME — Earth-moon-earth (moonbounce)
emf — Electromotive force (V)
ERP, erp — Effective radiated power
F — Farad
FCC — Federal Communications Commission (USA)
FET — Field effect transistor
FM, fm — Frequency modulation ("NB" — narrow band)
fsd — Full scale deflection
FSK — Frequency shift keying (F1 mode)
g — Gram
GDO, gdo — Grid dip oscillator
GHz — Gigahertz (1000 MHz)
h — Hour (24 hour clock), hecto
H — Henry
HF, hf — High frequency (3-30 MHz)
HI, hi — Greetings
HT, ht — High tension (V) (also hV, HV)
Hz — Hertz (cycles per second)
IARU — International Amateur Radio Union
IC, ic — Integrated circuit
IF, if — Intermediate frequency
ITU — International Telecommunications Union
k — Kilo (1000) — e.g. kilo-ohm (1000 ohms)
kg — Kilogram
kHz — Kilohertz (1000 Hz)
km — Kilometre
kV — Kilovolt
kW — Kilowatt
LAOCP — Limited Amateur Operator's Certificate of Proficiency
LC — Inductance capacitance (ratio)
LED — Light emitting diode
LF — Low frequency (30-300 kHz)
LT — Low tension (V)
m — Metre
m — Milli (one thousandth, 0.001)
M — Mega (1,000,000; e.g. 1 MHz = 1000 kHz)
u — Micro (0.000001) (one millionth)
uA — 0.000001A (also uF, uH, uV)
mA — Milliampere (0.001A) (also mM, mV, mW)
MCW — Modulated CW (A2 mode)
meg — Usually megohm
MF — Medium frequencies (300-3000 kHz) (medium waves)
MHz — Megahertz (1000 kHz)
mic — Hamads — microphone (also mike)
micromicro — Same as pico, obsolete term
mm — Millimetre
mox — Manual operated transmissions
MUF — Maximum usable frequency
NL — Noise limiter
ns — Nanosecond (0.000000001) (one thousand millionth of a second)
OSC — Oscillator
OSCAR — Orbiting Satellite Carrying Amateur Radio
om — Old man
P, p — Power (p page, pp pages)
p — Pico (0.000000000001) (one million millionth)
PA, pa — Power amplifier
PCB — Printed circuit board
pep — Peak envelope power
pF — Picofarad
Ph — Hamad — telephone No. (STD code first)
Phone — (fone) Telephony-segment, voice transmission
piv — Peak inverse voltage
PM, pm — Pulse modulation, phase modulation
ppi — Plan position indicator (radar)
PSU — Power supply unit
Q — Reactance-resistance ratio, transistor
Q code — CW abbreviations — see Handbook for amateur operators
QTHR — Hamad — address correct in current WIA call book
RF, rf — Radio frequency
RFC, rfc — Radio frequency choke
rfi — Radio frequency interference
RI — Radio Inspector
RMS, rms — Root-mean-square
RST — Readability, strength, tone (reporting signals) (RS only for telephony)
RT — Radio Telephony
RTTY — Radio teletype (teleprinter)
Rx — Hamads — receiver
SAE — Also sase. Self Addressed Stamped Envelope
SHF — Super High Frequencies (3-30 GHz) (microwave regions)
S/N, s/n — Signal to noise (ratio)
SS — Solid State
SSB — Single Sideband (suppressed carrier) — A3J mode
SSTV — Slow Scan Television
Std — Standard
SWL — Short Wave Listener
SWR — Standing Wave Ratio
Tcvr — Hamads — transceiver
TPI — Turns per inch
tptg — Tuned plate tuned grid
TV, tv — Television
TVI, tvi — Television interference
Tx — Hamads — transmitter
UHF — Ultra high frequencies (300-3000 MHz)
V — Volt
VFO, vfo — Variable frequency oscillator
VHF — Very high frequencies (30-300 MHz)
VLF — Very low frequencies (3-30 kHz)
vox — Voice operated transmission
VOX — Voice operated transmission
VU — Volume unit
VXO — Variable crystal oscillator
W — Watt

WARC — World Administrative Radio Conference (General) (ITU)
WIA — Wireless Institute of Australia
WICEN — Wireless Institute Civil Emergency Network
WT — Wireless telegraphy
WW, ww — Wire wound
Xfmr — Hamad — transformer
Xtl — Crystal (sometimes xtal)
xtl — Crystal (sometimes xtal)
Xvtr — Transvertor
XYL — Wife
YRCS, YRC — Youth Radio (Clubs) Scheme
YL — Young lady
Z, z — Impedance

DX AND THE NOVICE

Len Poynter VK3ZGP/NAC

The challenge of working DX with low power is the ultimate test of the novice operator's special virtues. Patience, endurance, determination and know-how. It also provides the oppórtunity to learn these virtues. The exhilaration of each successful contact makes the experience worthwhile. Invariably, persistence adds new countries, perhaps to a growing DX CC.

Other operators' results tend to create the impression that, in order to be heard you need high power and a very large antenna, are not necessarily true. What surprises many is the results of low power SSB signals.

Most novice stations have succeeded in DX-ing with modest antennas at affordable heights. An exotic antenna will help — for sure. However, at lower powers the greatest consideration is efficiency of the antenna — no compromise, must be the order.

An understanding of propagation is important to any form of operating, especially so in low power work. It will depend heavily on good to optimum propagation conditions, both because of the inherent power level and the difference between yours and most other normal rigs being used on the bands. The best results are obtained when "pipeline conditions" exists to a given area. The characteristics are most apparent on low power signals on long distance paths.

It also seems clear that long paths exhibit optimum propagation in one direction only. No doubt due to the fact that the height and density of the F2 layer follows the movement of the sun's ionizing rays from an east to west direction. As a result, the optimum path in an east to west direction precedes the same path in a west to east direction, which simply means that signals, say, from eastern Australia will reach and maintain a peak level into central Europe for some time before the reverse takes place. In other words, watch the path you are interested in to observe when optimum conditions exist. This can come quite suddenly when the station you are interested in working is in QSO with another station in a closer area — his signal rises and he has trouble copying the other station. Many experience this effect without realising what has happened.

Seasoned low power workers are aware of the movement of peak areas, judging the variation in signal reports. In a nutshell — pay attention to signal levels from a given area as an index to when the path to that area will open for you.

When they begin to drop, go after the area until it begins to click. You may only make a couple of contacts, but it will be fun when it does. Don't expect them to last long despite you wanting to chat — resist the temptation. One must persist in making periodic calls during the period a path is apparently open.

Robert VK6NAI's well equipped station

Successful operators develop their own techniques through experience. Some are consciously applied while others are conditioned responses. For it is the operator's knowledge of the multiplicity of factors involved that leads to successful communication. One of the prime considerations is the familiarity with one's own equipment.

The manipulations involved in operating your station should not interfere with the process of concentration. Such matters as tuning should be to the point where it requires little or no attention.

CW: One should be able to tune the desired signal and know exactly which one's signal should be in relation to the station to be called. This is a matter of familiarising oneself with the offset between zero beat and transmit frequency of your equipment.

SSB: A knowledge of one's own voice characteristics, and the ability to use it in its most intelligible range, is important. Attention to enunciation, fluency in the use of standard, effective phonetics. Understanding the speech characteristics of your microphone and the transmitter's audio system — especially if your signal is down in the mud at the other end. Seasoned operators find that effective use of enunciation, speed of delivery, use of phonetics and voice level means a QSO — or no QSO.

The remainder is pure technique. Sometimes it pays to sit back and wait until no one is left. Your call, clearly once or twice if you're sure no one else is there, will be all that's required. Avoid the urge to jump in when others are calling — think of how the other operator will recognise you in a pile-up.

Non-English speaking stations do not always understand rough speech. Use your best spoken English when working these stations. Speak slowly and distinctively. Avoid the use of words that might confuse. Come back to basic English. You will know when they copy. Listen for instructions if he is having difficulty with copy. Whilst he may be QRM free to you, you can be sure that you won't be to him.

The temptation to linger with DX is fraught with problems. Be courteous and time your QSO so that others may share your experience. But recognise signs of the band going out. Don't be left talking to yourself. Many do, and wonder why.

By the return of peak conditions, the QRM factor will be much higher and last longer. Adapt your techniques to the situation as it occurs. With these conditions approaching rapidly, don't create chaos by uselessly calling over the top of

someone else. Take notice of the operating habits of the high density amateur population countries. Don't clear till you are absolutely clear. But make sure you have all the information needed to ensure the successful completion of your QSO. If you request a QSL, nominate and verify the means of QSL-ing.

I trust that you will have great pleasure in meeting many countries in your DX experiences. It's handy to have some up to date reference on your own country should you be asked an awkward question.

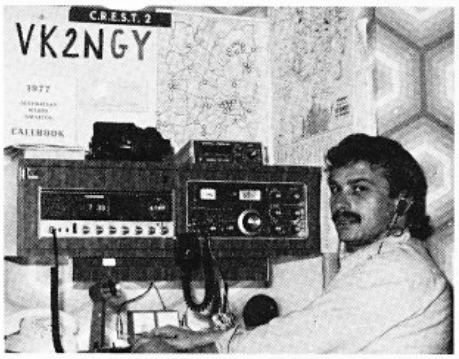
Good DX-ing. ■

WHAT SOME OF SYDNEY'S NOVICES ARE GETTING UP TO

Photos by: Arthur VK2NJL.
Stories by: Sam VK2BVS.

No. 1
John VK2NAR is one of the growing numbers of novice amateurs who are transmitting and receiving photographs as well as live shots of people, animals, scenery or, as you can see, you can even send your own CQ DX call through what is known as slow scan television (SSTV). By using typical amateur transceivers, the only extra equipment required for receiving photos is an SSTV monitor which can be built for $50, for transmitting photos just feed prerecorded audio signals which you can have recorded on a simple cassette tape recorder. In the photo John uses a close circuit television camera which he can use to transmit "live" or which he can use to record photos on to cassettes for the local novices who are getting started in SSTV. John runs a 5 element 15 metre yagi beam and a 5/8th ground plane on ten metres up on a 50 foot tower. John has had SSTV contacts with amateurs in Japan, the United States, Western Samoa and Russia. In the mobile John uses a modified 11-metre Zodiac Taurus transceiver on the new 23 channel system on 10 metres. Using a 3 foot centre loaded whip on 28.5 MHz, John recently worked KZ5BA in the Panama Canal zone while mobiling to work.

No. 2
Frank VK2NGY became interested in amateur radio when he heard them for the first time on channel 9 (now 5) as one of the original CREST monitors. Today Frank is the Secretary of the Sydney Crest and President of the Northside Radio Society. Working to bring a new era between amateurs and CBers, Frank is active not only on channel 9 (5), the bushfire emergency and maritime frequencies, but also on the 80, 15 and 10 metre amateur bands. Frank is really looking forward to some real DX-ing with a proposed 4 element beam on 15 and 10 metres. Being the well known Sydney CREST 2 and the immediate past national secretary for CREST and NCRA, Frank is involved and has directed many fellow CB enthusiasts to the activities of the Novice amateur radio group at the WIA as well as the Amateur and Citizens' Radio (VKCB) Club.

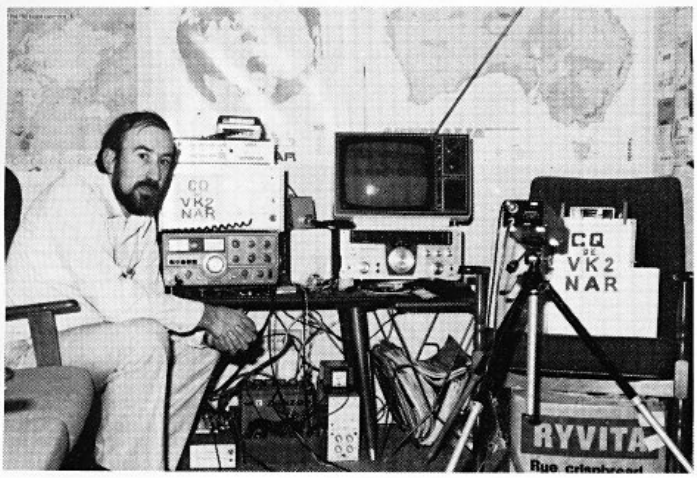


No. 2

No. 3
Mike VK2NEV obtained his novice licence at the age of 13 through the Radio Club at the St. Edmond School for Blind Children. His friend, Paul VK2NFC, obtained his licence at 12 years of age, both being granted a novice licence through a special oral exam conducted by the Department of P. and T. Mike uses a TS520S on 80, 15 and 10 metres and also operates a Gemtronics 11 metre set modified on to 10 metres. His antennas consist of a quarter wave ground plane on 10 metres, a half wave dipole on 15 metres and an 80 metre half wave and fed to an aerial tuner. Mike is currently aiming at the full licence and hopes to put up either a yagi or a quad on to the 15 and 10 metre bands.

No. 4
Simeon VK2NIC obtained his novice licence at the age of 14. He is one of the active club radio instructors who conduct

No. 3



No. 1

No. 4

training courses at his home to assist CB-ers who need to gain 5 hour instructional time to qualify for membership of the Amateur and Citizens' (VKCB) Club. Simeon can be seen in the introduction to amateur radio section of the club training session outlining the 10 metre Sydney craze of bicycle mobile, equipped with a 3 foot centre loaded antenna clamped on the back support, 12 volt wet cell over his shoulder and AM-SSB hygain 5 transceiver (mod.fied) strapped to the front of the bicycle structure. When not mobiling on 28.5 MHz on his bike, he operates a TS520S on 80, 15 and 10 metres and still finds time to talk to the local CBers on 11 metres and have them drop in on a Saturday afternoon to participate in the VKCB club training sessions. On 10 metres and 15 metres Simeon uses a quarter wave ground plane. Simeon is keen to obtain his full licence so that he can use all those other bands on his TS520S. ■

INTERFERENCE

Amateurs living in cities or populous areas have been plagued for many years with problems of causing interference to neighbours' radio, TV, tape recorders, hi-fi equipment and other electronic appliances such as organs.

In general, the subject has been well researched and simple remedies devised. A large bibliography on the subject appeared in the September 1974 issue of the journal of the Wireless Institute of Australia "Amateur Radio" which is unfortunately now out of print.

The greatest problem concerning interference is the attitude of neighbours. This social matter causes more trouble than anything else. The merit of the equipment of the person concerned is always considered to be beyond reproach and interference is regarded as an unwarranted intrusion into the home. Legal suits in the USA and even in Australia reinforce the advice that interference complaints must always be tackled with the utmost restraint and good nature. Defending suits at law is a costly and time consuming business, so do your best to avoid them.

Members of the Institute are most fortunate in being able to obtain advice from the Institute when in strife with interference complaints.

Interference works the other way also. Amateurs suffer from it also, especially on the 6 metre band from Channel O TV stations as an example. (Not forgetting pirates and intruders into amateur bands.) ■

QSP

1978 SUBSCRIPTION

Subscription notices will be mailed to Institute members early this month as usual. Members are requested to send in their payments as early as possible so that the enormous volume of clerical work can be suitably phased over the forthcoming holiday period. Early payment also ensures no automatic suppression of AR address labels from the computer because of being unfinancial.

UPGRADING THE BARLOW WADLEY XCR-30 MARK 2 RECEIVER

Rodney Champness VK3UG

Quite a few newcomers to amateur radio will have bought a Barlow Wadley. The receiver functions quite well and is probably one of the most effective communications portable receivers about. A review of this set has appeared in AR and EA. One problem that has always annoyed me has been the relative ineffectiveness of any external aerial connected to the terminals provided. The set was prone to break-through from television stations on some bands and had a lot more birdies all around than I considered reasonable. I had a chance to try a Yaesu FRG-7 and found this set had few if any birdies. Considering that these sets both use the Wadley loop principle I looked for and found one fundamental difference.

The Barlow Wadley uses a capacitor to couple an aerial to the top of the aerial coil, the Yaesu uses a low impedance link to couple the aerial to the aerial coil. I wound with care low impedance links on all three aerial coils and brought the unearthed end of these coils out to a switch and a coaxial connector on the rear of the set on the main case. The receiver now had stacks of gain on the lower frequencies, in fact the broadcast stations cross modulated at my former residence. The birdies almost disappeared, the set became very different to what I had been used to.

HOW TO DO THE MODIFICATIONS

The aerial coil selector switch is a single pole 3-position Oak switch. It is mounted just above and to the rear of the power and speaker sockets on the left hand end of the set. A coaxial aerial socket such as a BNC, Belling Lee or UHF connector, is mounted on the right hand end of the top of the set alongside the earth socket in the comparable position to the telescopic aerial at the left hand end of the case. This is all the mechanical work involved in the modification. When you drill the holes for these two components be careful that no metal filings get into the work, drill the holes with the set back off and the set lying on its back.

WINDING THE LINK COILS

All of the low impedance links are wound with 24 to 28 gauge enamelled copper wire. The 8-30 MHz coil has 5 turns of wire wound between the turns at the earthy end of the coil which is then connected to one of the switch terminals as shown in the diagram. If desired the tuned winding can be tapped at the 5th turn and the tapping point taken to the switch. The link windings are all painstakingly put on by threading the wire under and over the tuned windings. A pair of needle nosed pliers are needed to accomplish this, there is just enough room between the tuning coils and the circuit board to allow this. Wind 8 turns on the earthy end of the 2-8 MHz coil and 15 turns on the 0.5-2 MHz coil. The exact number of turns on each coil is not particularly important. The earthy end of each link winding is earthed to the same spot as the earthy end of the particular tuned winding.

This modification causes no alteration to the peaking of the aerial coils, and gives you the choice of using either the older capacitive coupled aerial matching system or the newer and better low impedance input. Note that light duty coaxial cable should be run between the wiper arm of the 3 position switch and the coaxial aerial connector. If you follow the attached diagram you should have no problem with this modification.

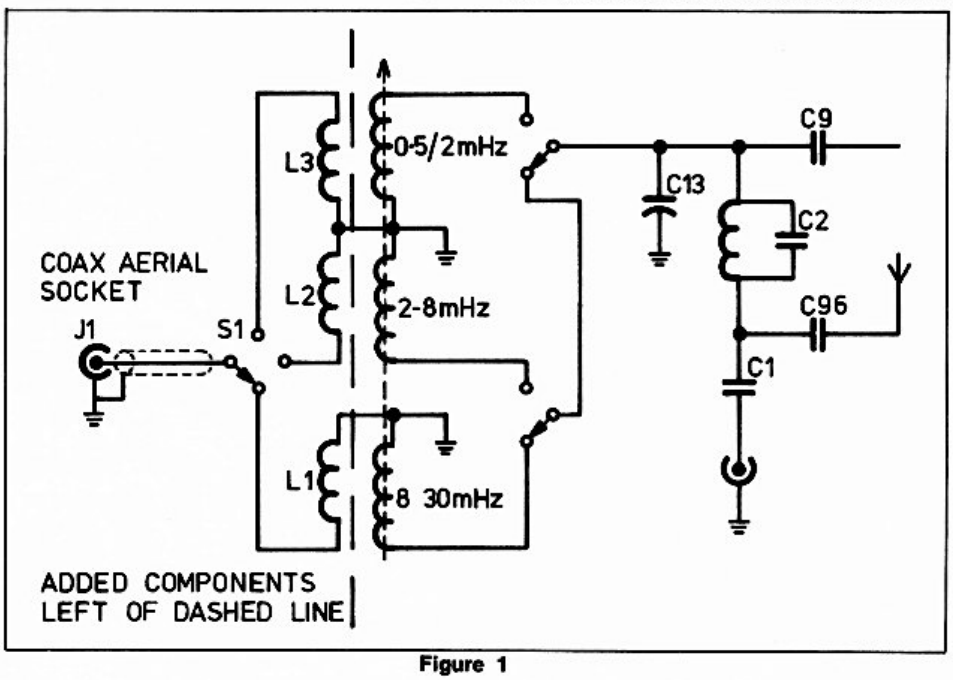


Figure 1

GENERAL

It has been some time since Newcomers Notebook last appeared in AR; it will appear about three or four times per year now.

My article on *Suppression of Electrical Noise Caused by Vehicle Electrical Systems* in February 1977 issue brought a number of letters enquiring where the Ducon PNC51 coaxial capacitors could be obtained. I regret to say that these capacitors are no longer produced. This is a pity because they were good value at around $3, whereas the only others I have been able to locate are imported by Robert Bosch and cost around $10 each. I would be pleased to hear from anyone who knows of a supply of coaxial filter capacitors similar in performance to the now unobtainable Ducon PNC51. Capacitors of this type probably now have the biggest market that they have ever had in this country — the CB market. What about it, manufacturers? ■

UNDERSTANDING MORSE "LANGUAGE"

Dick Goslin VK3NAY
40 Hardwicke St., Balwyn, Vic. 3103

This article is written with a view to assisting newcomers to CW operation who, although conversant with the "Q" code, may not be familiar with the abbreviations generally used, and which enable a good deal of information to be exchanged in a relatively short period.

It is prompted by two recent instances heard on air — (i) "Please send plain language, I do not understand abbreviations". (ii) "Thank you for a very nice contact. I will send you my card through the bureau, could you please send me one of yours? Thank you again and I hope we will have another contact soon." The latter could have been expressed adequately in a fraction of the time as follows — "Tnx fb QSO. QSL via buro? Pse cfm. Tnx agn es hope cul."

An effective way to "learn the language" is to listen to a QSO at about the speed you can copy with reasonable comfort — there are plenty at the lower end of 80 metres. Write down each character exactly as you hear it, just as you did at the exam (?). Do not concern yourself at this stage whether the letters or words make sense.

Later on, with the receiver switched off, read through your copy several times until you can correlate what was **sent** with what was **meant.** Some words may still be vague, possibly through sending or receiving errors, or perhaps because some abbreviations are a little harder to follow than others.

Main thing is to listen often, say 10-15 minutes a night if possible, until you can recognise and understand abbreviations without actually having to think about them. Try to find a QSO in which characters and spacing are well defined — it will make your "read-back" so much easier.

A few final points —

1. Don't be afraid to tackle a QSO above your "normal" speed. There is no penalty for missed or incorrect speed. Give it a go, and you'll be surprised how quickly your receiving ability will improve.
2. Don't "invent" abbreviations. Stick with the generally accepted ones for good understanding by both parties.
3. Upgrade your sending speed **after** increasing receiving speed.
4. Remember that practice up to 14-16 w.p.m. (plain language, code groups and figures) is available for approximately two hours nightly from 0930 GMT on or about 3550 kHz.

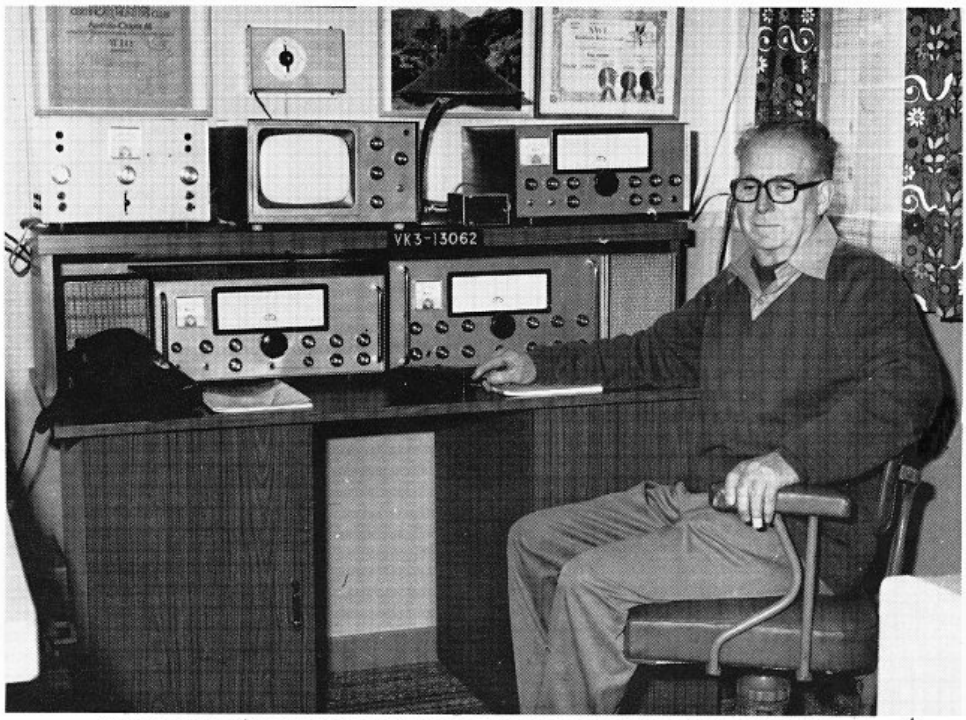
abt .... about
agn .... again
ant .... antenna
buro .... bureau
cfm .... confirm
condx .... conditions
cu agn .... see you again
cul .... see you later
es .... and
fb .... fine business
fer .... for
ge .... good evening
gn .... good night
gud .... good
mx .... metres
nite .... night
pse .... please
rx .... receiver
tnx .... thanks
tks .... thanks
tx .... transmitter
u .... you
ur .... your
vy .... very
wx .... weather
xtal .... crystal

These are **some** of the abbreviations in general use — others will become familiar as you listen and put them into context in your "read-back". ■

MODIFICATION TO THE TUNING RATE OF THE FRG-7

Maurie Batt VK3/I3062,
R.S.D. Rokewood Junction, 3351

Most owners of a FRG-7 receiver will agree that it is a very fine receiver and that the only criticism would be in respect to the rather high tuning rate. Below is a guide set out on the procedure on how to carry out the modification to the tuning rate.



Well known short wave listener Maurie Batt at the controls of his station.
Photo courtesy of the Ballarat Courier Pty. Ltd.

All that is required is a Jackson slow-motion drive (this is available from Bail Electronic Services) and two 4 BA countersunk screws. Tools required are:

1. Junior hacksaw.
2. 1-1/8 inch chassis punch.
3. No. 32 drill.
4. 4 BA tap.
5. Philips screwdriver.
6. Screwdriver with long thin blade.
7. Pair compasses.

On the assumption that the relevant details of all models of the FRG-7 are the same, proceed as follows.

Remove the six screws around the front of cabinet and the three screws around the rear of cabinet, the chassis can then be withdrawn through the front of the cabinet. Remove all of the control knobs and the locking nut on the Mode switch. Remove the two screws that hold the LED lock indicator; this is situated on the rear of the panel. Remove the three screws from the escutcheon, when removing the escutcheon take care not to foul up the Lock LED. Remove the eight countersunk screws around the edge of the plastic panel surround and the four screws on the front panel. The panel can now be removed but take care in this operation as the foam rubber back on the rear of the panel could be torn off. This completes the dismantling process.

Measure off 5/16 inch from the boss of the main tuning shaft and cut off with Junior hacksaw. As this has to be done with the shaft in situ, it will be necessary to relieve the strain on the tuning mechanism by placing a wooden block under the end of the shaft and grip the end of the shaft with the fingers.

Take the Jackson slow-motion drive, the shaft is about 5/8 inch long, cut off a ¼ inch, and when rough edges are removed the shaft will be just under 3/8 inch long. The hole in the panel must now be enlarged to 1-1/8 inch to accommodate the body of the slow motion drive. This can be done with a 1-1/8 inch chassis punch and with care there is no danger of the panel being buckled. To be sure of cutting the hole concentric with the original hole, set a divider to about 1/8 inch and with one leg on the inside of the hole run the divider round the hole; the scribed circle will indicate the position of the new hole which should be 1-1/8 inch in diameter. When fitting up the chassis punch make sure that the cutting edge is on the scribed circle and with care proceed to enlarge the hole. Refit the front panel, engage the Jackson drive on the tuning shaft and ensure that there is a clearance around the drive unit. Drill two holes as shown in Fig. 1, tap out to 4 BA. Now fit the drive and tighten the grub screws, screw in the two 4 BA countersunk screws just tight enough to hold the body of the drive, fit the tuning knob and check for freedom of movement.

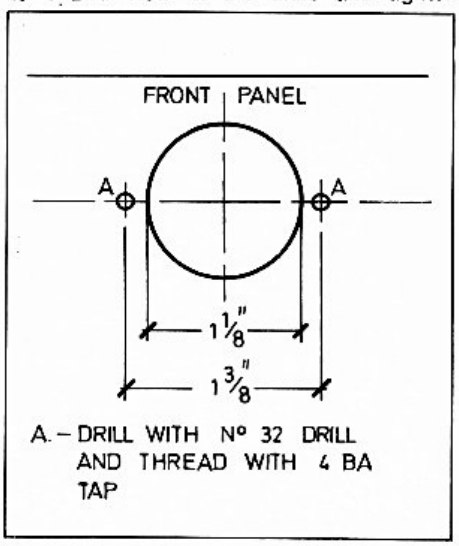


FIG. 1.

Take the escutcheon and enlarge the hole to clear the flange on the drive unit. The material the escutcheon is made of is very pliable and the hole can be nibbled out to size, or better still if a 1 inch chassis punch is available so much the better. When refitting the escutcheon locate the LED in the hole first. To re-assemble, carry out the dismantling procedure in reverse.

When fitting the tuning knob do not replace the large felt washer as this is not required now. If the tuning is too free a thinner felt washer will replace the thick one. With the modification carried out you will have an excellent slow motion tuning rate which will be about 65 turns of the knob to cover the 0-1000 on the dial. This may seem a little tedious with a slow tuning rate but the benefit will be appreciated by the extra DX that can be heard with the slow tuning rate that would otherwise be missed.

At a later date, details of a modification to this system will be published whereby the original tuning rate will be retained and the extra slow speed selected at will. ■

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SSB/AM TRANSCEIVER
27 MHz CITIZENS RADIO SERVICE

The SSB 1000 embodies the latest in high frequency transceiver design techniques. It is designed to operate on either AM, USB or LSB. It is capable of transmitting and receiving on a total of 54 channels (18 AM, 18 USB, 18 LSB). The 18 channels are in accordance with the P&T Dept conditions for operation of the Citizens Radio Service.

NETT PRICE $220.00
Registered Post — $4.00

TRADIPER MODEL TE-15

The Model TE-15 Transistorised Grid Dip Meter is a very accurate instrument operating from a 9 volt battery power supply. Six plug-in coils are supplied with each unit, covering the frequency range of 360 kHz to 240 MHz.

The Model TE-15 can be used for a number of useful purposes. With the most common use as a Grid Dip Meter, can also be employed as a relative field strength meter. It is ruggedly constructed and very light in weight. Because of transistorised circuit employed there is no need for an AC power supply as used in many other models. The Model TE-15 will certainly prove invaluable to radio amateurs.

NETT PRICE $55.00
Postage $2.40

TE-20D RF SIGNAL GENERATOR

Frequency Range: 120 Kc to 500 Mc in 6 bands. Band A 120-320 Kc, Band B 320-1,000 Kc, Band C 1-3.4 Mc, Band D 3.2-11 Mc, Band E 11-38 Mc, Band F 36-130 Mc (Fund.) — F' 100-500 Mc (Harm.).
Output (RF): High 100,000 uV max.), Low 100 uV max.).
Output (Audio): 400 cps., approx. 8V (adjustable).
Modulation: 400 cps., internal.
Power Requirements: 105-125 volts, 220-240V AC, 50-60cps.
Tube Complement: 1 — 12BH7, 1 — 6AR5, 1 — Silicon Rectifier.
Dimensions: 140 (h) x 215 (w) x 170 (d).
Shipping Weight: 2.8 kg.

NETT PRICE $75.00
Postage $3.00

FM LEAD ANTENNALESS MICROPHONE

MODEL FIRST-101 (Uni-directional Condenser Microphone)

A new professional quality uni-directional condenser microphone featuring superb sensitivity and excellent frequency characteristics. Very easy handling because of cordless microphone. Operates on just one UM-3 battery for 100 hours of continuous use. Very economical. The transmitting frequency freely adjustable within FM radio band. If using without lead antenna, sound is caught within about 50 metres, when using with reinforced antenna to jack at the bottom, range is extended up to about 100 metres.
Accessories: Battery UM-3, Wind screen, Adjusting screwdriver, reinforced antenna line, microphone stand.

NETT PRICE $33.90
Postage $1.40

HANSON SWR6

POWER METER & FIELD STRENGTH INDICATOR

Handy for checking transmitter operation. Uses bridge method for SWR measurements. Simple and accurate operation. CM method employed for RF power measurement.

NETT PRICE $22.00
Postage $1.80

MODEL 110 POWER METER & STANDING WAVE BRIDGE

The Model 110 is a handy, compact device for the Amateur Radio or CB station in checking transmitters and antenna performance.

NETT PRICE $28.50
Postage $2 00

MODEL 95-130 3-FUNCTION TEST INSTRUMENT

The 95-130 test instrument is a compact 3-function test meter to indicate the condition of any 52 ohm CB antenna system and transmitter by testing for Standing Wave Ratio, relative RF power or field strength. Tuning of transmitters is possible when using this meter as a field strength meter. Also handy for comparing antennas. Designed to be used for base stations or mobile operations and can be permanently installed in antenna systems without any measurable loss of power.

NETT PRICE $22.50
Postage $1.50

MODEL 151 LOW POWER TVI LOW PASS FILTER

The 151 is designed to be installed in low power communications equipment such as CB radios, in the antenna transmission line to reduce the interference caused by the CB radio in other high frequency receivers such as television receivers. This is accomplished without reducing the power of the CB radio with special tuned circuits inside the filter.

NETT PRICE $15.50
Postage $1.40

MODEL 140 ANTENNA MATCHER

This model combines the function which enables simply to match the transmitter to the impedance of the antenna on CB or amateur radio stations.

Specifications — Frequency: 25 to 40 MHz; RF Power: 100W max.; VSWR: under 1 : 1.05; RF Power Loss: under 5 per cent.

NETT PRICE $17.50
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PLUG-IN POWER SUPPLY

Plugs directly into 240 volt mains supply power sockets and provides 12 volt 1 amp smoothed DC for powering low voltage and battery operated equipment — Transceivers, cassette recorders, cartridge players, burglar alarms, electric models and toys, car radios, etc. 12 Volt 1 amp SEC approved, double insulated, overload protected.

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CRYSTALS

Channel No.	Freq. MHz	Channel No.	Freq. MHz
1	27.015	11	27.135
2	27.025	12	27.155
3	27.035	13	27.165
4	27.055	14	27.175
5	27.065	15	27.185
6	27.085	16	27.195
7	27.095	17	27.205
8	27.105	18	27.225
9	27.115	27	880
10	27.125	27	240

$7.50 PAIR — Postage 25c

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ARLEC PLUG-IN BATTERY CHARGER

A high performance charger for batteries used in cars, caravans, boats, motor cycles, etc.
Delivers 1 amp output at 12 volts. Designed to run continuously over long periods, will maintain a fully charged battery in peak condition or recharge flat battery. Double insulated for max. safety, electrically protected by fully automatic circuit breaker. No mains leads to get tangled, plugs directly into power socket. Comes with 3 metre battery leads fitted with clips. For use on 240V, 50 Hz supply.

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MODEL YWI

STANDING WAVE BRIDGE, FIELD STRENGTH AND POWER INDICATOR

YW-1 is a handy, compact device for the amateur radio station in checking transmitters operation. For measurements, it uses the bridge method of comparing the power supplied to and reflected from the antenna system. Continuous monitoring of the transmitter output is possible by having the instrument in the circuit at all times. The model can be used as a simple field strength meter by disconnecting it from the feedline and attaching a small pickup antenna.

Meter Sensitivity: 200 uA on DC current (at full scale; **VSWR Meter Range:** 1 : 1 — 1 : 3; **Power Meter Range:** 0 — 10W; **Impedance:** 50; **FS Meter Range:** 0 — 10 dB; **Accuracy:** 1.5 MHz — 50 MHz 10 per cent; **Dimensions:** 5¾ (h) x 2-3/8 (w) x 3 (d) in.; **Weight:** 16.58 ozs.

NETT PRICE $22.00
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2 STN INTERCOM and battery 9V $12 90
3 STN INTERCOM and battery 9V $18.90 ea.
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Complete with 60 ft. wire, Ideal for garage, baby room, etc. — **Postage $1.50**

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FT-200 FIVE BAND TRANSCEIVER

ECONOMICAL SSB! from YAESU

GENERAL DESCRIPTION

A superb quality, low cost, versatile Khz transceiver. Covers 80-10 mx, tuning range 500 Khz each band. On 10 mx, crystal supplied for 28.5-29 Mhz. (Crystals available optional extra for full 10 mx coverage.) SSB, CW, AM; with a speech peak input of 300w. Transistorised VFO, voltage regulator, and calibrator, 16 valves, 12 diodes, 6 transistors. PA two 6JS6C pentodes. ALC, AGC, ANL, PTT and VOX. Calibrated metering for PA cathode current, relative power output, and receiver S units. Offset tuning ±5 Khz. Uses a 9 Mhz crystal filter with bandwidth of 2.3 Khz at —6 db. Selectable sidebands.

Provision for use of optional external VFO, FV-200 VFO includes fixed channel facility.

Operates from conservatively rated separate 234 volt 50 Hz AC power supply, FP-200, which includes built-in speaker. Transceiver incorporates power take-off and low level R.F. drive outlets suitable for transverters.

Cabinet and panel finished in black.
If required for novice use, the power can be easily reduced. If a separate external crystal oscillator (not supplied) is used then fixed C.C. transmit operation would be possible, with tunable reception.

Hand Held or Desk Mic. Optional Extra.

TECHNICAL DATA

Mode of Operation:	**SSB (A3J), Phone (A3H), CW.**
Frequency Range:	**3.5 ~ 4.0, 7.0 ~ 7.5, 14.0 ~ 14.5, 21.0 ~ 21.5, (28.0 ~ 28.5), 28.5 ~ 29.0, (29.0 ~ 29.5), (29.5 ~ 30.0 Mhz).**
Frequency Stability:	**After Warm-up, 100 CPS/30 Min.**
Spurious Response:	**Better than — 40 db.**
Antenna Impedence:	**50 ~ 100 Ω Unbalanced.**
Carrier Suppression:	**Better than —40 db.**
Side Band Suppression:	**—50 db at 1000 CPS.**
3 RD Harmonic Inter-modulation Distortion:	**—30 db (P.E.P.)**
Transmission Bandwidth:	**3 Khz.**
Receive Sensitivity:	**0.5 μV S/N 10 db.**
Filter Selectivity:	**2.3 Khz (—6 db) 4 Khz (—60 db).**
I.F. Mixing Beats:	**50 db Down.**
Image Interference:	**50 db Down.**
AGC Characteristic:	**Amplified AGC.**
Receiver Output Power:	**1W (at 10% Distortion).**
Weight:	**17.6 lbs.**
Dimensions:	**13¼" Wide, 5½" High, 11" Deep.**

Price, including sales tax, excluding freight:
FT-200, including FP-200 Power Supply — $628.00
FV-200 — $149.00 *DC-200 DC P S $239.
Prices and specifications subject to change.

JAS7778-17

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	PRINS RADIO, 123 Argyle Street, Hobart 7000	Ph. 34 6912
N.S.W.	Aviation Tooling, STEPHEN KUHL, 104 Robey St., Mascot. 2020	Ph. 667 1650 AH 371 5445
	Amateur & Novice Comm. Supplies, W. E. BRODIE, 23 Dalray Street, Seven Hills. 2147	Ph. 624 2691
	DIGITRONICS, 186 Parry St., Newcastle West, 2302	Ph. 69 2040
QLD.	H. C. BARLOW, 92 Charles St., Aitkenvale, Townsville. 4814	Ph. 79 8179
	MITCHELL RADIO CO., 59 Albion Rd., Albion. 4010	Ph. 57 6830
A.C.T.	QUICKTRONIC, Jim Bland, Shop 11, Altree Crt., Phillip. 2606.	Ph. 81 2824 82 2864

160 METRES FOR THE REALISTIC AX-190

Gary Hambling VK5AS,
c/o Post Office, Cowell, 5602

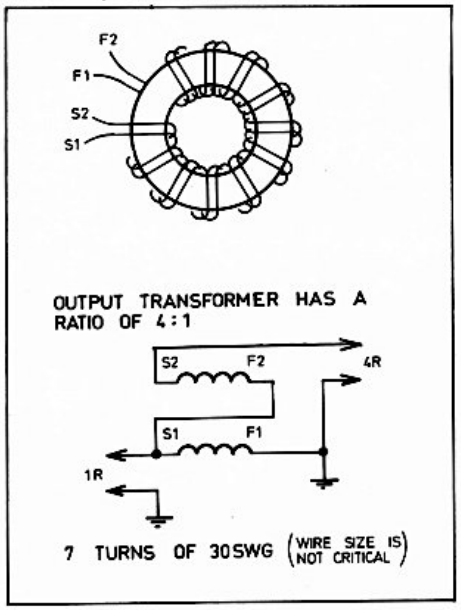
Although an excellent receiver for its price, the Realistic AX-190 does not cover the 160 metre band. To overcome this limitation a simple converter can be fitted as described, converting 1.8 MHz to 14 MHz or another band if preferred.

The local Tandy store had a special offer on the AX-190 at half-price, so I acquired one of these beauties. I considered various ways of modifying it to cover 160 metres and decided that the simplest was to fit a converter.

CONVERTER

The converter circuit is shown in Fig. 1, and its general layout is indicated in Fig. 2. It is built on a printed-circuit board about 75 by 50 mm (3 by 2 inches). None of the components is critical, and some possible alternatives are suggested on the circuit. The coils are broadcast band oscillator coils from two Tandy coil packs. They resonate at 1.8 MHz with a capacitance of about 10 pF. Pin numbers for the coils are printed on the cardboard packages in which they are supplied.

The wide-band IF output transformer is of 2 : 1 ratio using two 7 turn bifilar windings of about 26 to 30 SWG on a small ferrite toroid obtained from the WIA components service. The oscillator crystal frequency is 12.2 MHz, as one was on hand, and it conveniently translates 1.8 MHz to 14 MHz. Any crystal may be used, providing the resultant output is on a band covered by the receiver.



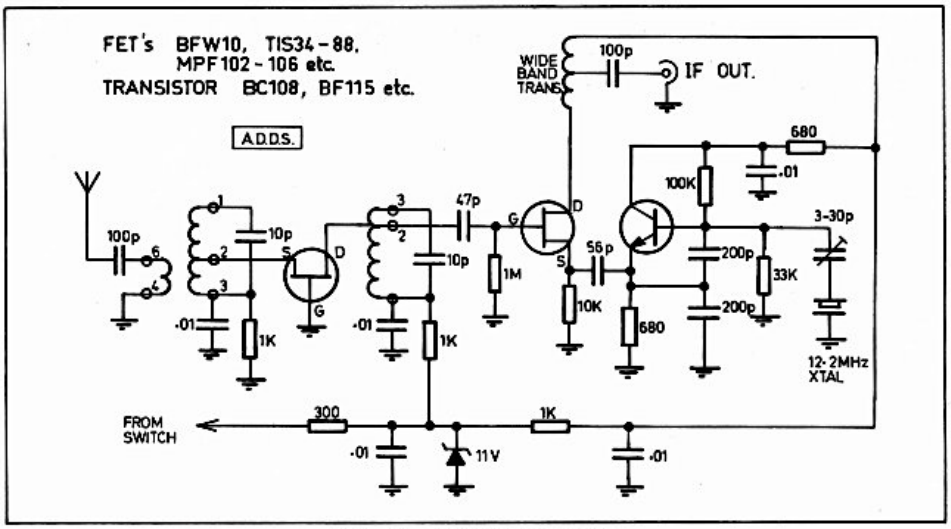


FIG. 1 — Converter Circuit

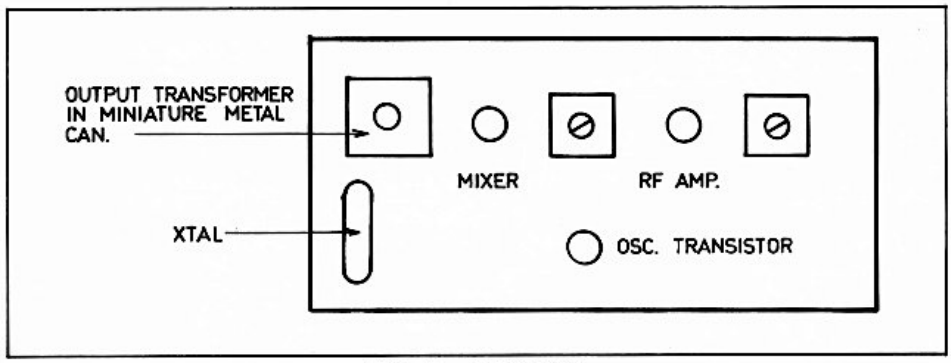


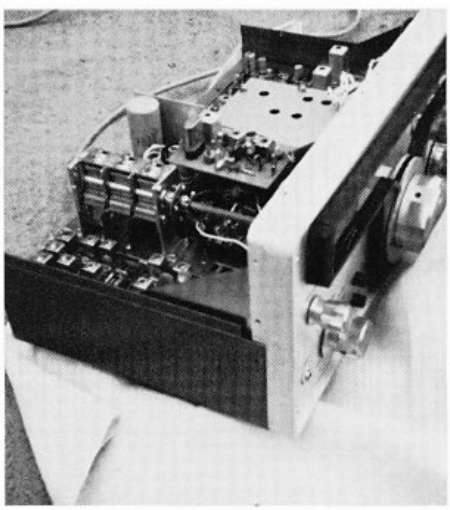
FIG. 2 — PCB layout

FIG. 3 (left) — Wide Band Output Transformer Details

INSTALLATION

A double changeover miniature 12 volt relay was fitted near the antenna socket. It is wired so that when energised it connects the antenna to the converter input, and the converter output to the receiver input. The converter itself is mounted on top of the VFO cover (using existing screws) as shown in the photograph.

On the front panel of the AX-190 there are two calibrator push-buttons, one for 100 kHz spots and one for 25 kHz. I thought that 100 kHz only was an unnecessary feature, so I used this switch to operate the converter. The two wires to the 100 kHz switch were disconnected, and transferred to the 25 kHz switch. Thus freed, the 100 kHz switch is now used to feed unregulated DC supply to the converter and the relay coil. ■



The 160 Mx Converter is mounted on top of the VFO Cover

AN HF TVI SUPPRESSION TECHNIQUE

A popular and effective method of suppressing TVI from HF transmissions is the use of an isolating transformer in the TV feedline. This isolating transformer is used to suppress longitudinal currents in the feedline. The desired TV signal being a transverse current.

The TV feedline can approach a resonant condition at HF and is often closely coupled to the amateur antenna as it is only a couple of wavelengths away on higher bands. On the lower bands it is within a wavelength.

Due to the close coupling a considerable RF voltage may be induced longitudinally in the TV feeder. The use of an isolating transformer wound on a balun core or similar will isolate this voltage from the TV set. This isolating transformer must be connected as close to the TV set terminals as possible.

A suitable transformer may be made for other 75 ohm coax. systems or for 300 ohm ribbon systems by winding a pair of 2 turn windings through a balun core. One winding is corrected to the antenna and the other to the TV set. The transformer so formed has a 1 : 1 impedance ratio and very little coupling for the longitudinal component.

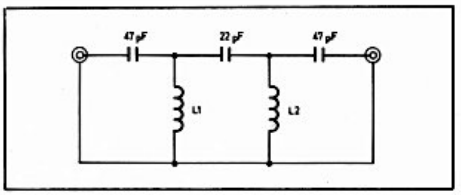


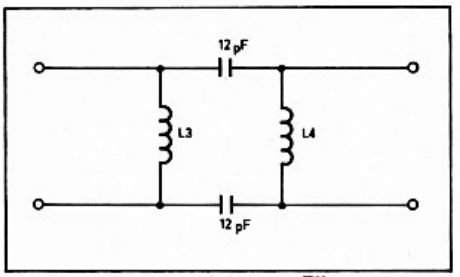
FIG. 1 — 75 ohm High Pass Filter

The frequency range of such a transformer extends from the region of 3.5 MHz to 200 MHz with very little variation in attenuation. Thus only the longitudinal voltage will be attenuated and any pickup by the TV antenna will need further filtering.

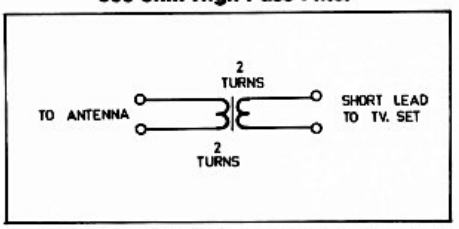
If the TV antenna is picking up some HF as a transverse signal then this can be simply filtered out by a simple high pass filter after the balun core transformer.

SIMPLE HIGH PASS FILTERS

Simple high pass filters can be made using a double neosid assembly. The can of the assembly provides a simple and neat container for the filter. A shim or circuit board shield between the inductors may be soldered inside the assembly to a couple of base pins. ■



300 ohm High Pass Filter



Longitudinal Isolation Transformer (wound on TV Balun Core)

L1 and L2 are 9 turns of 28 SWG wound on Neosid 722 formers with no slugs in a Neosid type B assembly (double can).

L3 and L4 are 20 turns of 35 SWG wound on Neosid 722 formers with no slugs in a Neosid type B assembly (double can).

TRAP THOSE COLOURED TENNEESSEE VALLEY INDIANS

Gil Sones VK3AUI.

Before colour TV and the widespread use of coax. TV feeders, interference from 52 MHz operation could be cured by simple ribbon "suck out" traps. These were made up of 50 cm of 300 ohm ribbon shorted at one end and tuned to 52 MHz by a 3-30 pF trimmer across the other end. The whole trap was taped to the TV set ribbon feeder and tuned for elimination of the TVI.

Nowadays, coax. feeder is very popular and a somewhat different approach is needed. The easiest is to use open-ended quarter wave stub traps. The single stub is the simplest and should prove reasonably effective provided it doesn't unduly upset the SWR of the feedline on the TV channels. This can show up a nasty set of ghosts or maybe a reduction of the channel 0 signal below the level necessary for colour reception — an unpardonable sin in the eyes of the TV set owner. So if you use the simple quarter wave stub as shown in Fig. 1 adjust it with care and check the effect on all channels.

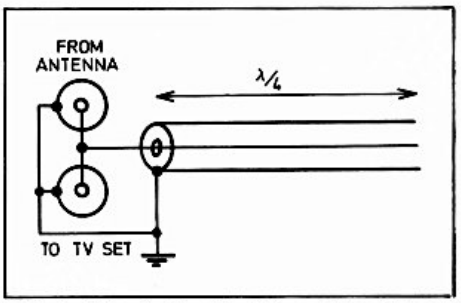


FIG. 1. Simple Quarter Wave Open Circuit Stub.

Cut to quarter wave length, allowing for the velocity factor of the coax. Adjust by starting a little too long and snipping off 5 mm at a time (¼ inch). The length should be 0.96 m for RG59C/U for 52.1 MHz operation.

If the simple stub is not effective enough improved rejection can be had by using two stubs spaced a quarter wave apart. This works by the first stub effectively shorting the line as before but now the line appears as an open circuit a quarter of a wavelength further along. This point is where we have cunningly placed another stub to effectively short the line here. The effect is much greater attenuation at the stub frequency. Although this arrangement, shown in Fig. 2, has a somewhat narrower bandwidth it is very effective.

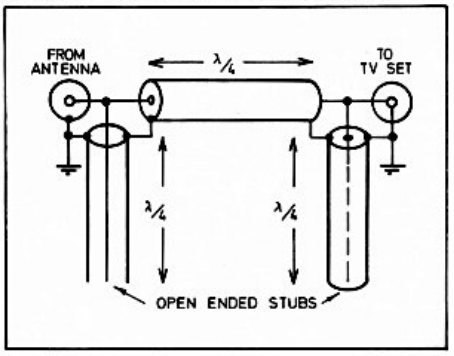


FIG. 2. Quarter Wave Spaced Stubs.

All stubs 0.96 m long for 52.1 MHz operation. Trim open circuit stubs 5 mm at a time for maximum attenuation of TVI.

Whilst the transmission line stubs are very simple their effects can be felt on

other frequencies which may not be acceptable. An alternative which gives very good results is the combination of series and parallel tuned circuits.

In both the series and parallel tuned traps shown in Figs. 3 and 4, the trimmers should be tuned for least 52.1 MHz interference. The values used may appear odd but have been carefully chosen to minimise funny effects on the TV channels due to their effect on the TV feeder's impedance. These can show up as a variety of distortions and will result in the TV viewer or his serviceman discarding them.

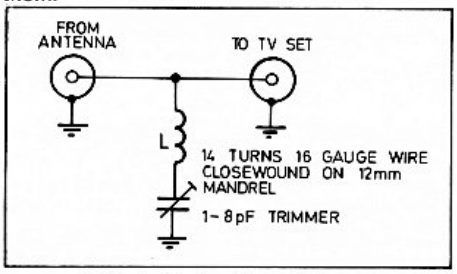


FIG. 3. Series Tuned Trap.

If these simple series and parallel traps are ineffective then the combination of series and parallel circuits shown in Fig. 5 can be quite useful.

A combination of series traps and a quarter wavelength of coax. is a very effective performer but can be more complex and bulky. See Fig. 6. It does not suffer as much from quaint off frequency effects as its all transmission line mate of Fig. 2.

This trap makes use of a quarter wavelength of 75 ohm line as an impedance transformer between the two series resonant traps thus producing a high attenuation. Since the transmission to the set

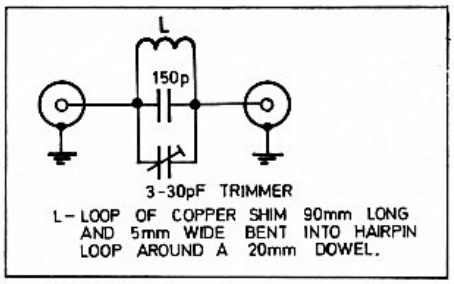


FIG. 4. Parallel Tuned Trap.

has only two shunt traps which appear highly inductive on the higher channels their effect is light. The 6 metre signal is very greatly reduced as the low impedance of the first trap attenuates the interference and this low impedance is transformed to a high impedance at the point where the second trap is connected by the quarter wave line. This results in more attenuation of the interference.

With all these circuits it must be remembered that the reduction of the amateur signal present at the TV set is the

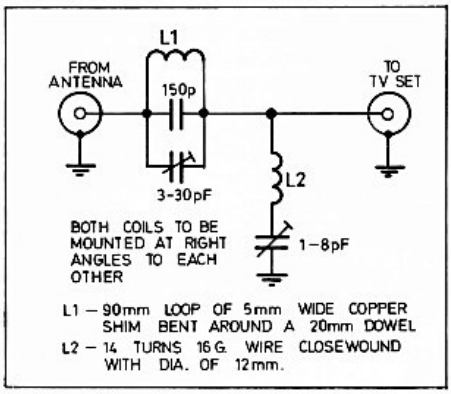


FIG. 5. Combined Series Parallel Trap.

objective and the TV traps must not be expected to act alone. The other means of reducing the signal should be applied. These include cross polarisation which is worth 20 to 30 dB. Separation of the TV and amateur antennae is worthwhile. The TV antenna should be efficient and provide a strong signal on all channels, however too strong a signal will push the TV set close to overload and the amateur signal may give it the final push.

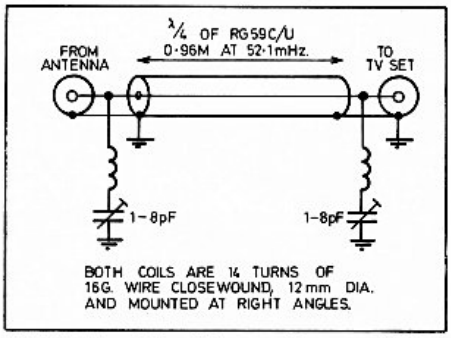


FIG. 6. Combined Quarter Wave and Series Resonant Traps.

Another aspect is that of separation in frequency which allows the TV circuitry and the TVI traps to work more effectively.

Lastly the power level should be kept down to the minimum necessary to make the contact with the other amateur rather than him and all your neighbours.

All the traps described here may be adjusted prior to insertion in the TV feeder by firstly using a GDO and then by listening to a strong 6 metre signal with the trap in your feedline and tuning for a null. When inserted in the TV feeder only a minor tweek will be required thus avoiding covering the neighbour's carpet with solder blobs and 5 mm bits of coax. ■

A CHRISTMAS TREE LAMPS PROJECT

N. Cooper VK4ZNC
5 Cahill St., Strathpine 4500

This circuit may interest those who have had little to do with logic circuits. Most basic logic projects seem to have little use when completed. This one has an unusual use which can be enjoyed by anyone.

What does it do? Any number of lights up to 16 placed on the Christmas tree may be made to come on in order from top to bottom or vice versa. After all lamps have come on in order they will stay on for a period, which is adjustable, and then they will all extinguish together and stay off for

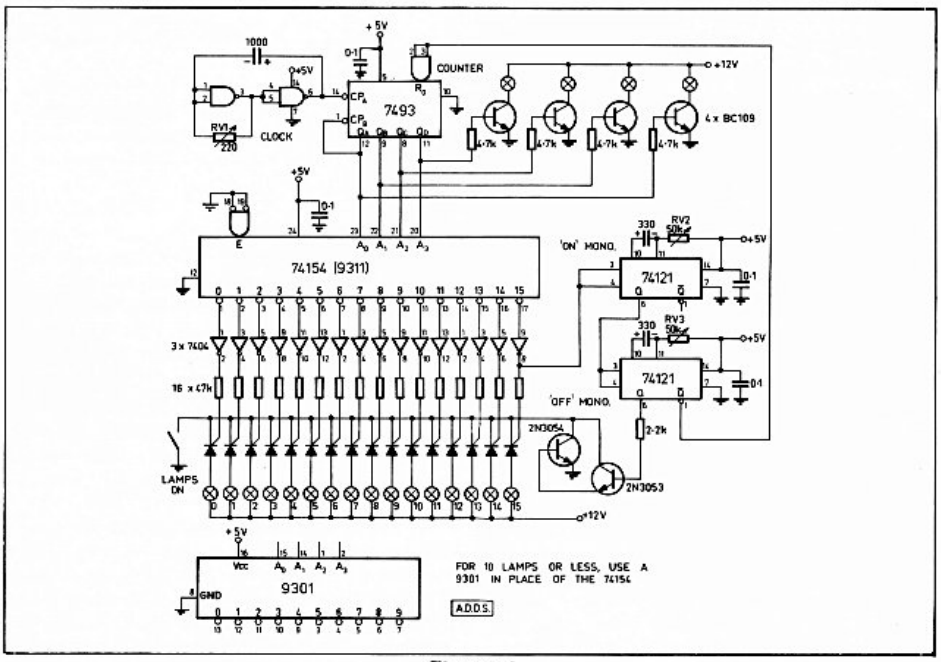


Figure 1

a period which is also adjustable. If desired another four lamps can be connected which will count to 16 in binary notation. Normal commercial type 12V lamps are used on the tree.

OPERATION

Two nand gates connected as inverters form a clock which produces a low frequency square wave. RV1 adjusts the frequency. The pulses from the clock are fed into the binary counter which produces binary on its output ABCD leads. The binary turns on transistors TR1 to TR4 each time a logic 1 appears on any of the bases. Thus the lights in the collector circuits follow the binary code. The BCD output of the counter is also fed into the decoder which decodes the binary into decimal. The outputs of the decoder are normally high and go low in turn with BCD applied. To fire each of the SCRs in turn a positive has to be applied to the gates. Since the decoder outputs are normally high, inverters are necessary on all outputs so that they go high in turn, which is what is required. As the SCRs fire in turn they lock on until the 2N3054 transistor is turned off so removing the anode potential and thus releasing the SCRs. When the last decoder output goes high after going low (count 17), the "on" monostable receives a trigger pulse. Its Q outputs change over and after a delay, determined by components C2 and RV2, revert back to the stable state. Its Q output in going from a 1 to 0 then triggers the "off" monostable which changes its Q outputs over. In so doing the two transistors are turned off, releasing the SCRs and off go the lamps. The change on Q also resets the counter. After a delay the "off" monostable reverts back to its stable state so everything is back to the starting point again and the procedure repeats itself.

Note that the circuit shows pin connections for both 9301 and 74153 decoders. This is in case 10 or less lamps are required. If so the 9301 should be used.

The unit was built on a PCB and boards will be available to anyone who is interested in building the unit. ■

THE JIGGLER DANGLER

Bruce L. McCubbin VK3SO,
3 Kildare Street, Burwood, 3125

This is a gadget to assist in the etching of one-off PC boards by maintaining agitation of the etchant bath. VK3SO calls it his "jiggler dangler".

The gadget consists of a 500 ohm BPO relay with an extension attached to the armature. The armature travel has been increased to about 3 mm, and a set of break contacts is arranged so that as soon as the relay actuates it drops out again. A 500 uF electrolytic in series with a 100 ohm resistor is connected in parallel with the coil to slow down the release action, and the usual arc-suppression components are connected across the contacts.

The armature extension consists of a scrap of PC board material about 80 mm long and 12 mm wide, attached to the armature by means of the residual gap adjusting screw. This extension has several holes along its length to accommodate a plastic stud which supports the board to be etched. The choice of hole depends on the degree of agitation required and the armature loading. Large boards will need to be supported nearer to the pivot point.

The device is supported above the baseboard by a pair of wooden uprights about 25 by 12 mm with about 12 mm separation and about 30 cm high. These allow the relay to be adjusted up or down as required, and also to be swung out sideways if needed to inspect the progress of the etching. I use a 0 to 30 volt regulated DC power supply to energise the relay, and this allows adjustment of the jiggling rate.

METHOD OF USE

The board is attached by selecting a suitable spot, preferably fairly central in an unused section of the board, and drilling a small hole in it. This is then used to attach the board to the stud by means of a small self-tapping screw or other convenient method.

A fairly deep dish should be used for the etching bath. Adjust the height of the board so that it is just clear of the bottom of the bath and pour in the etchant until it covers the board by about 3 mm. Then switch on the supply and adjust the volts until a steady agitation takes place. The reason for using a deep dish is that considerable turbulence occurs, and with a shallow dish there may be spillage.

The advantage of this gadget is that you can set the board up in the bath and go on with another job while the etching takes place. But he warned, the etching process is much quicker than the old method of rocking the bath. Don't get too deeply involved in some other project and over-etch your board! ■

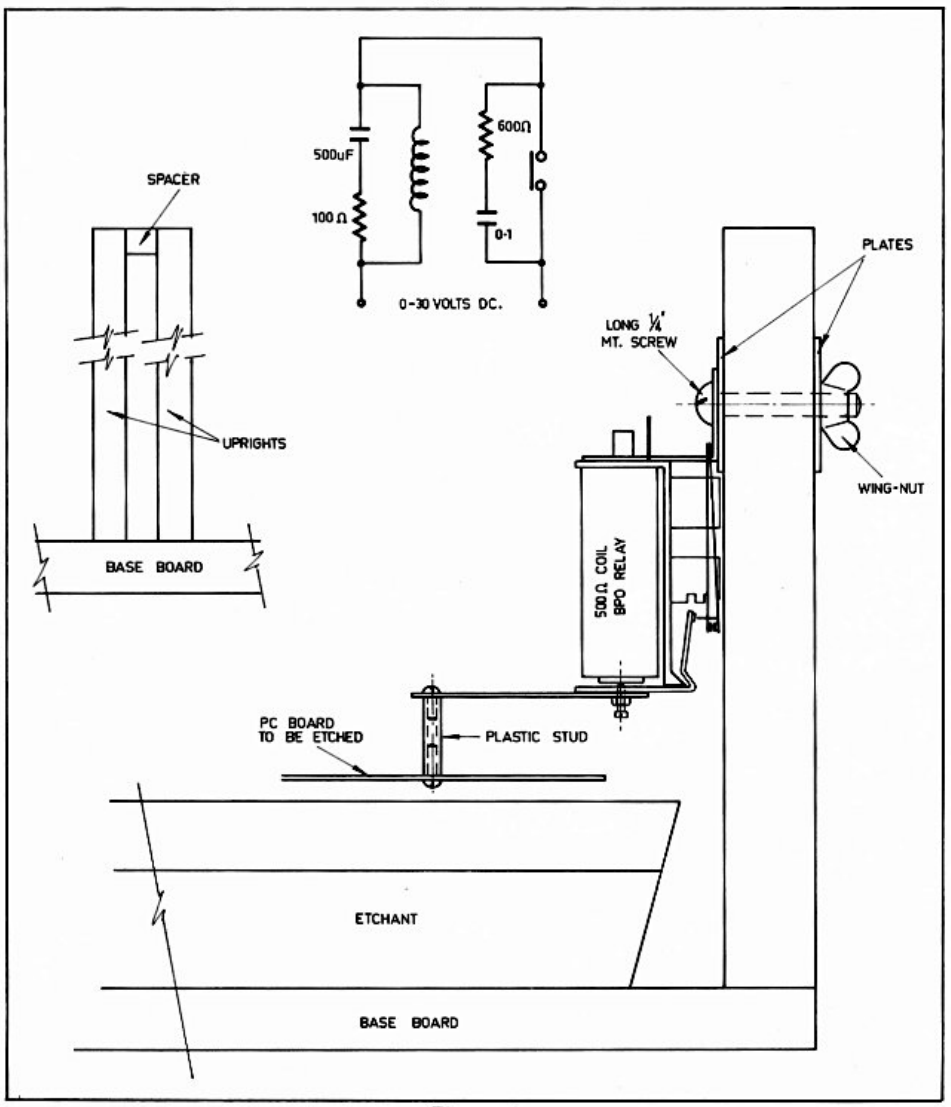
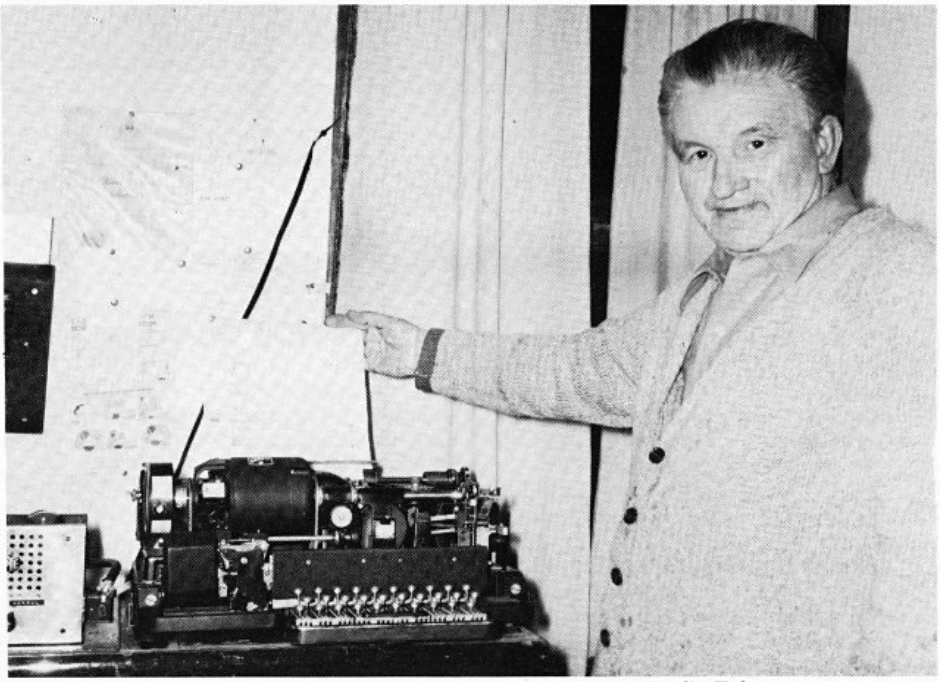


Figure 1

FACETS OF AMATEUR RADIO — A PICTORIAL ROUND-UP

Amateur Television

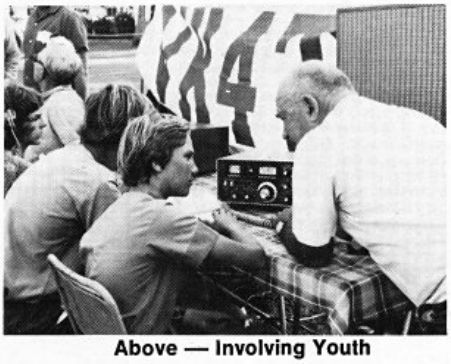
Discone — won't keep out rain



Radio Teletype

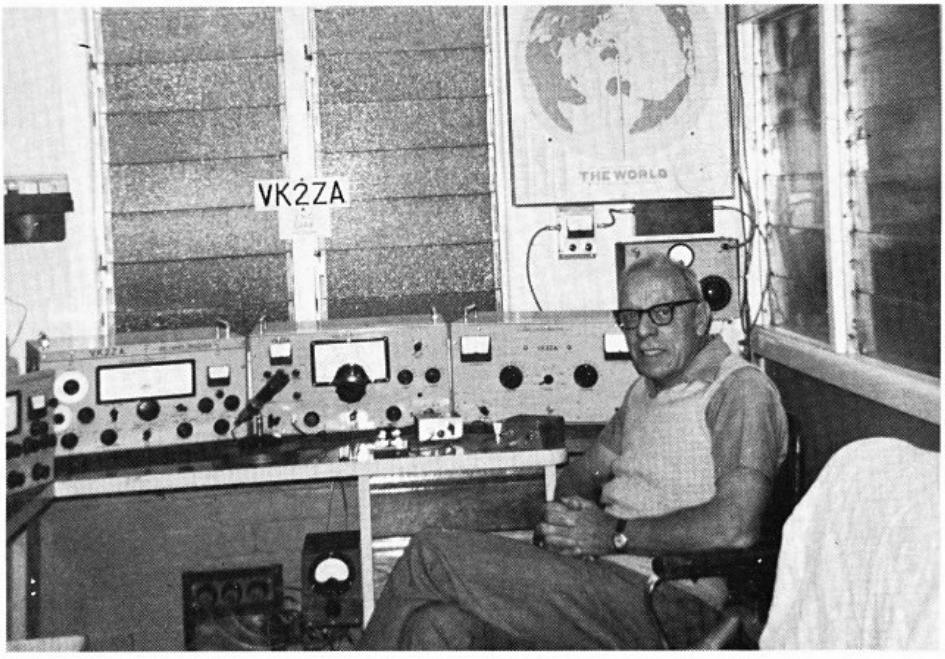
Left — "At Hamfests"

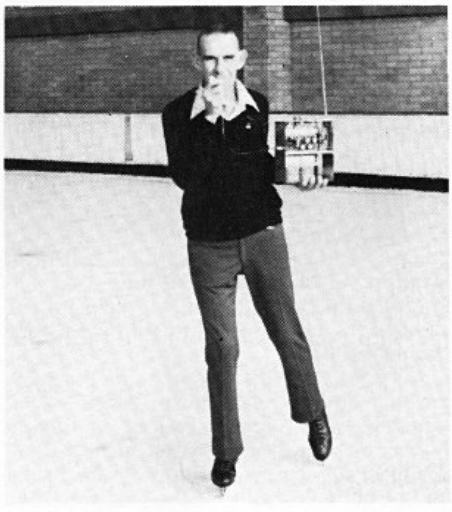
Below — All Home Brew

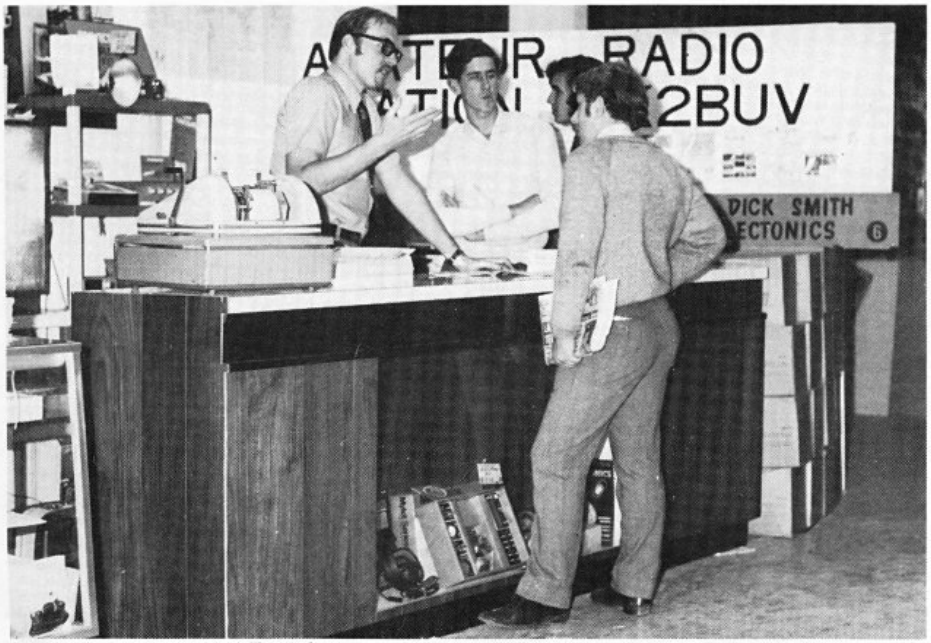


Above — Involving Youth

Below — Even Ice Skating (Roy VK3AOH)

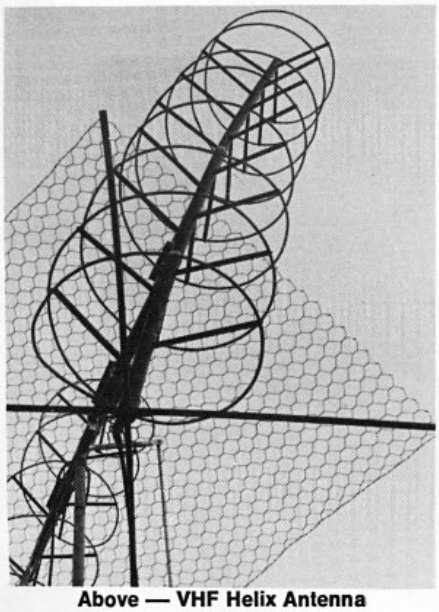




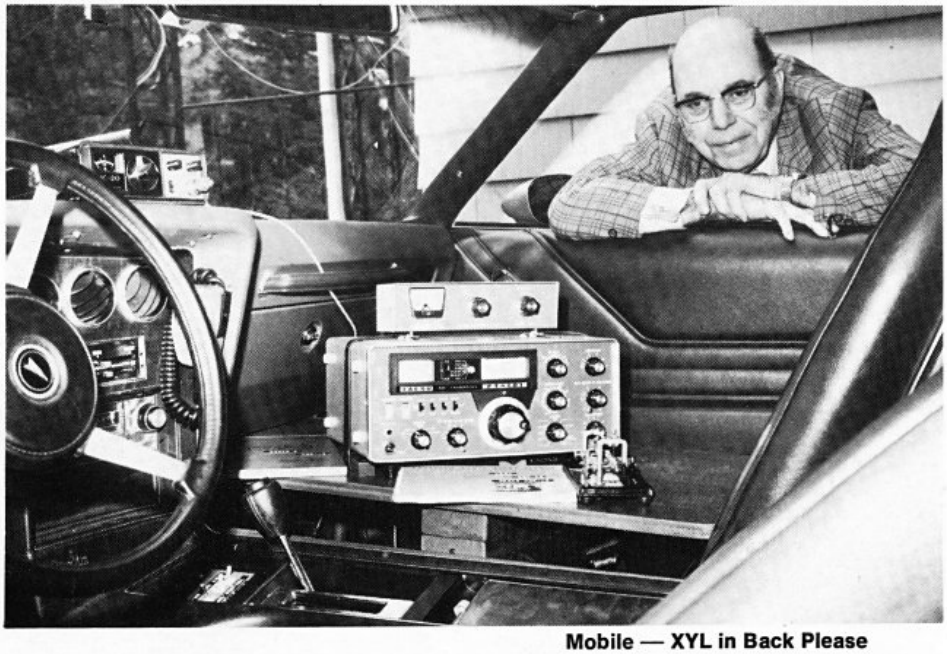


Meeting Old Friends

Little Willy Didn't Do It — Boy, Oh Boy, He Really Blew It!!

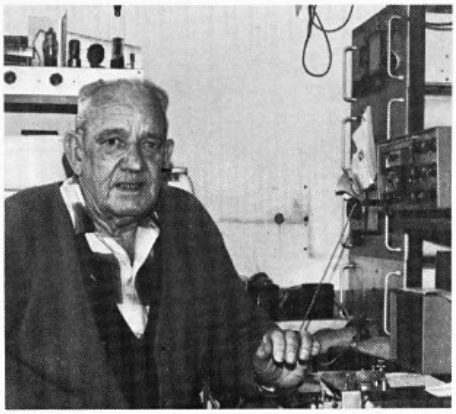


Above — VHF Helix Antenna

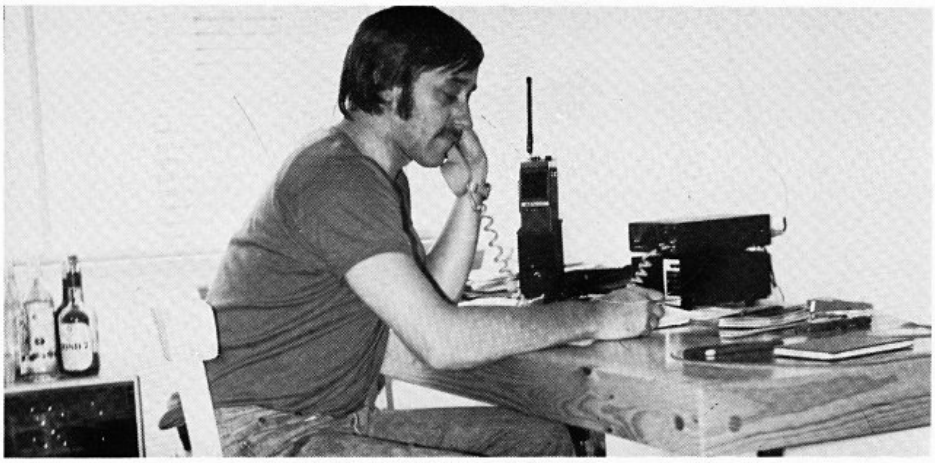


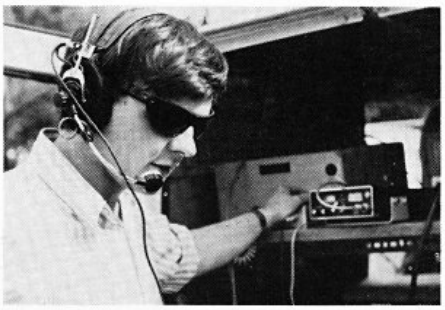
Mobile — XYL in Back Please

Left — In the Bush (beware of snakes)



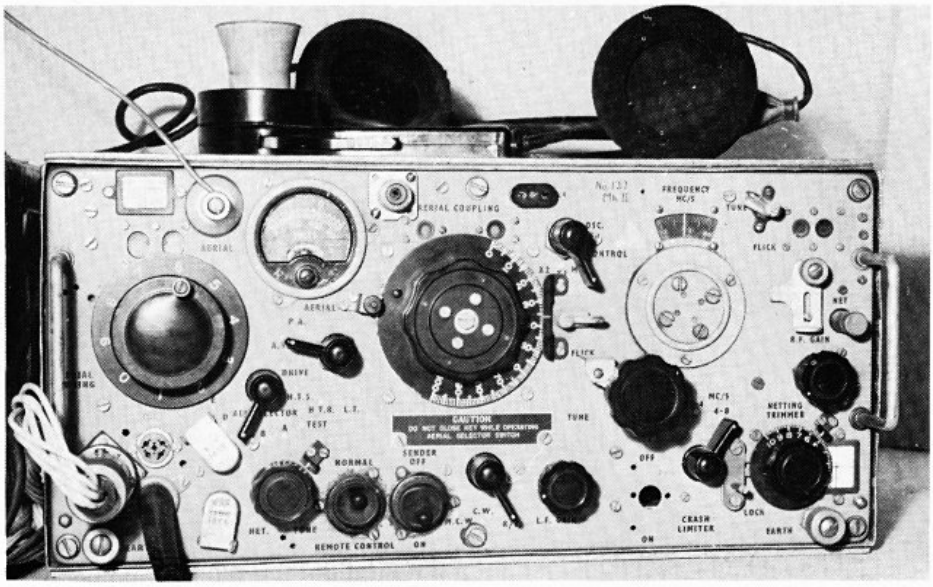
Dick VK2AHR

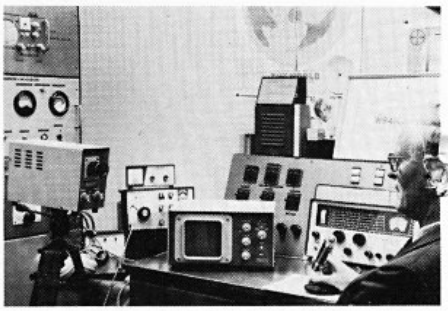




Above — Operating Portable

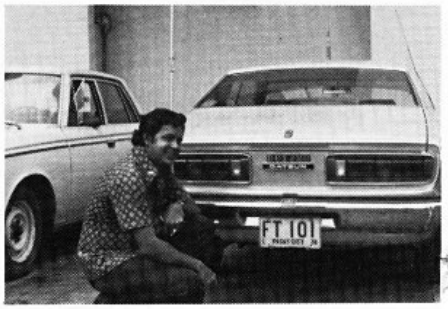
Left — Russell VK3NT, Co-Ordination during Cyclone Tracey





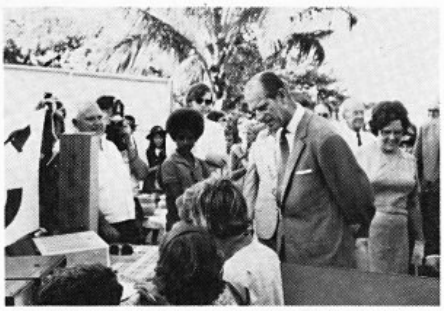
Above — Slow Scan TV

Left — Some Old Friends to start off with??



Above: 9M2CJ — Mobile Personalised Number Plate

Left — Mellish Reef, Dx-pedition

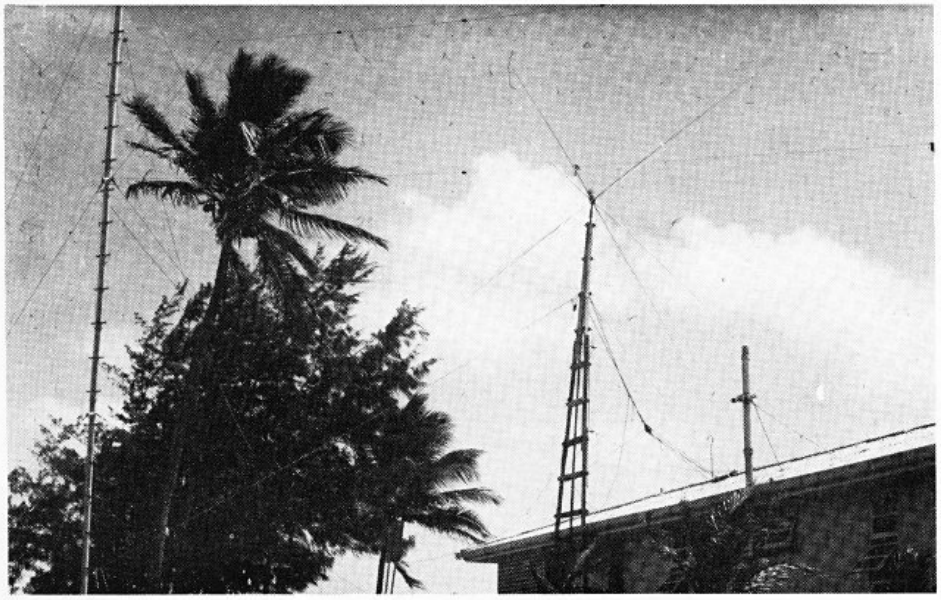


Royal Patronage

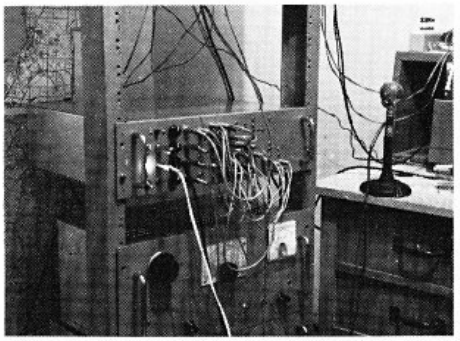
Above — Bruce VK3BM — Shack at Swan Hill, Vic.

Right — Annual WIA Convention

Below — Willis Island, VK9ZC — Lonely Outpost



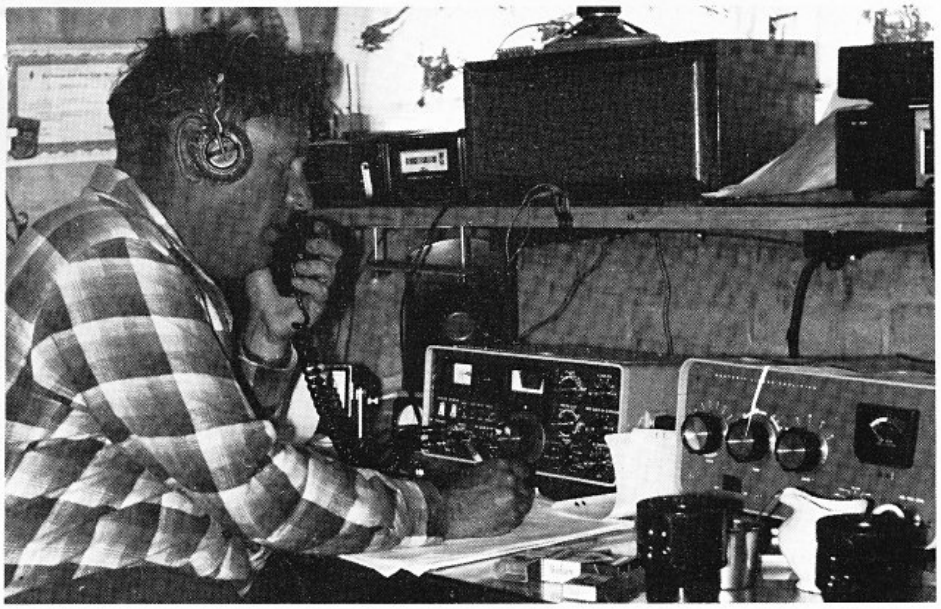
Below — Which Plug?

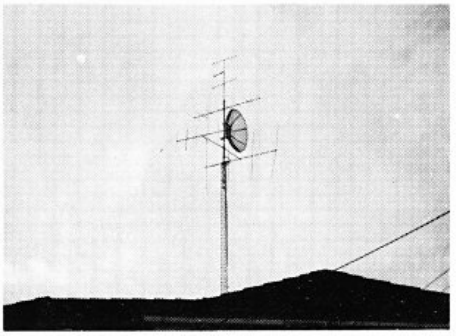


Above — Jamboree of the Air

Left — HF Link, Darwin Disaster

Below — VHF Antennae





YAESU

ADVANCED AMATEUR COMMUNICATION EQUIPMENT

FROM A WORLD LEADER —

FT-901 De-Luxe HF transceiver with pair 6146B PA, Dig. readout frequency memory, electronic keyer, a host of new unusual features. Availability early 1978. $TBA.

FT-101E TRANSCEIVER: 160-10 Mx, SSB, AM, CW, PA two x 6JS6C, 260W PEP input SSB. Built-in Dual AC/DC power supply. BUILT-IN RF SPEECH PROCESSOR. Solid state except for Tx. PA and driver. IF noise blanker, FET Rx RF amplifier, clarifier, built-in speaker. Export Mod. 240V AC, 12V DC **$859.**
M-101 MOBILE MOUNT for FT-101E. **$34.50.**

FT-301S 160-10mx, fully solid state Tcvr suitable for Novice use. 25W PEP max. **$699.**

FT-301 160-10mx. Fully solid state Tcvr, built in RF Speech Processor, 200W PEP Input. **$949.**

FT-301D DELUXE DIGITAL Tcvr. Similar to FT-301, **$1149.**

* **FP-301 MATCHING POWER SUPPLY.** 20 Amp 12V suit all 301 Transceivers. **$178.**

* **FP-301D DELUXE POWER SUPPLY.** With built in 24 hr or 12 Hour Clock and auto — CW ident Keyer provision. **$288.**

Programmed IC for FP-301D ident. $35.00.

YO-301 MATCHING MONITORSCOPE for FT-301 Series. **$389.**

FC-301 ANTENNA COUPLER, inc. SWR & Pwr meters, ant. switch and connectors. **$195.**

R-301 RELAY BOX for FT-301 to FL-2100B. **$23.**

FT-200 TRANSCEIVER: 80-10 Mx, PA two x 6JS6C, 260W peak input SSB. Manual, PTT or VOX control, offset tuning, calibrator. Can be modified for novice use. AC Power supply and transceiver. **$628.**

* **DC-200 DC POWER SUPPLY** 12V for FT-200. **$239.**

FT-75B TRANSCEIVER: SSB and CW. VXO, noise blanker, squelch. Very small size, transistorised, valve PA, a superb little rig. 80W PEP. Microphone and five crystals included. **$388.**

* **FP-75B AC POWER SUPPLY:** 230V for FT-75B/BS. Built-in speaker, power cable and plug. **$88.**

* **DC-75B DC POWER SUPPLY:** 12V for FT-75B/BS. Includes built-in speaker, mobile mount, power cable and plug. **$92.**

FL-101 TRANSMITTER: Solid state 160-10m, PA two 6JS6C, all facilities. Companion unit to FR-101. **$675.**

FL-101 SPEECH PROCESSOR: For installation in FL-101 **$79.**

FRG-7 WADLEY LOOP RECEIVER: All solid state, 0.5-29.9 MHz in thirty 1MHz bands. Electronic band selection. **$338.**

FR-101D RECEIVER: All solid state, 23 bands incl. all amateur bands 160-10m plus 6 and 2m, FM, CW, etc., etc. **$915.**

FR-101D DIGITAL: Has all the options of the FR-101D as well as DIGITAL READOUT. **$1099.**

FL-110 SOLID STATE LINEAR AMPLIFIER. Companion unit to FT-301S. 10-15W drive, 200W PEP Input, 160-10mx. **$249.**

FL-2100B LINEAR AMPLIFIER: 80-10Mx, uses 2 x 572B triodes in G.G., twin fan cooled, styled to match FT-101E. **$578.**

FT-620B SIX METRE SSB AM, CW, TRANSCEIVER: 10W solid state, AC and DC operation. **$577.**

FT-221R TWO METRE TRANSCEIVER: Features all mode operation — SSB/FM/CW/AM — with repeater offset capability. 144-148 MHz coverage using advanced phase-locked loop circuitry. AC and DC operation. **$659. ($749** with Dig. Readout adaptor, a few only.)

M-620/221/301 MOBILE MOUNT for FT-620B, 221R & 301, **$34.50.**

QTR-24 24 HOUR WORLD CLOCK: At a glance the time anywhere in the world can be read. **$33.**

FTV-650B SIX METRE TRANSVERTER: Converts 28 MHz. SSB to VHF, and includes receiving converter. 50W PEP. Primarily designed for coupling with Yaesu transmitters **$249.**

FTV-250 TWO METRE TRANSVERTER: Similar FTV-650B. 10W-15W cutput, but all solid state and built-in AC PS. **$249.**

FT-223 TWO METRE TRANSCEIVER: 10W, 23 Channels, plus one priority channel. Inc. 40, 50 & 51, **$189.**

FT-227R 2mx, FM Tcvr, 800 Ch, with Dig. Readout, memory, rev. etc. **$375.**

YC-500E 500MHz FREQ. COUNTER: Accurate to .02ppm. **$574.**

YC-500S 500MHz FREQ. COUNTER: Accurate to 1ppm. **$446.**

YC-500J 500MHz FREQ. COUNTER: Accurate to 10ppm. **$319.**

YO-100 MONITORSCOPE: Matches the FT-101E, but can be used with other Yaesu equipment. (IF kits 455 kHz and 9 MHz optional extra). **$285.** (IF Kits **$12.00 each**).

YP-150 DUMMY LOAD/POWER METER: For use over the frequency range 1.8-200 MHz. Three power ranges, 0-6W, 0-30W, 0-150W with built-in cooling fan. **$108.**

FF-50DX 3-SECTION L.P. FILTER for TVI reduction. **$39.**

F-101 FAN. $38.

SP-101 MATCHING EXTERNAL SPEAKER for FT-101, FR-101, FRG-7. **$49. SP-120, for 301/221. $49.**

OPTIONAL CRYSTAL FILTERS. $63.

MATCHING VFOs: FV-101B, FV-200, each. **$149,** FV-301 **$159.**

YC-601 DIGITAL READOUT ADAPTOR for FT-101E, inc. built-in AC PS. **$256.**

YC-221 DIG. READOUT ADAPTOR for FT-221R. **$120.**

YD-844 DESK MICROPHONE: Yaesu De Luxe PTT Dynamic type with stand, spring and lock PTT switches. PTT also actuated when lifted from deck. **$49.**

HAND MICS. FOR YAESU, YD-846 etc., **$18.50,** plus connector.

RS SERIES HF GUTTER MOUNT MOBILE ANTENNAS: RS Base and Mast (doubles as ¼ wave on 2m). **$22.50.** Coil and Tip Rods: RSL-3.5, **$20.00.** RSL-7, **$19.00.** RSL-14, **$18.00.** RSL-21, **$16.50.** RSL-27/28, **$16.00.**

*Power Supply Price applies only with purchase of matching transceiver.

As the sole authorised Yaesu agent and factory representative for Australia since 1963, we provide presales checking of sets, after-sales services, spares availability and 90-day warranty.

Quote type of set, serial number, date of purchase, and inv. no. when ordering spares. All prices include sales tax. Freight is extra. Prices and specifications subject to change without notice. Allow 50c per $100 for insurance. Availability depends on stock position at time of ordering.

LARGE RANGE OF ACCESSOR

YAESU

SAHI ANTENN

HIDAKA

Cush Craft

STANDARD VHF and UHF TRANSCEIVERS

SR-C146A. 2m hand held 5 chan. 2W transceiver, inc. carrying case and 3 chns.	$248.00
SR-C432A, 70cm hand held 6 chan. 2W transceiver, inc. carrying case and 1 chn (435 MHz)	$285.00
SR-C430 70cm 12 chan. 10 watt mobile transceiver inc. 1 ch (435 MHz)	$342.00

STANDARD ACCESSORIES

CMP08 Hand mic. for SR-C146A and SR-C432	$25.00
CAT08 Rubber antenna (helical) for SR-C146A	$10.00
Heavy Duty Carrying Case for hand held units	$16.50
AC Adapter and charger for hand held units	$45.00
Mobile Adapter for hand held units	$14.50
AC Charger only	$11.00
Ni-CAD Penlight Cells, type AA	$1.90

MONITOR RECEIVERS

MR-2, Mini Monitor. 12 ch. pocket receiver VHF	$137.84
MS-2, Mini Scanning Receiver 4 Ch, inc.	$186.35

MARINE NOVICE/11 METRE TRANSCEIVERS

GTX-3325, SSB/AM 23 Ch. Inc. N.B.	$149.00
CBR-9000 6 Ch. In-dash mount. B.C. 2 FM	$129.00
606CB 23 Ch. AM/BC/FM MPx/Cassette stereo	$229.00
GTX-3336 AM 23 Ch. Transceiver	$41.00

ANTENNAS AND ANTENNA ACCESSORIES

HF VERTICALS

VS41/80KR 10m thru 80m, inc. 11m	$115.00
VS-RG Radial Kit for VS-41/80 KR	$33.50
18AVT, 10m thr 80m trap Vertical	$145.00
18V 10m thru 80m base loaded vertical, exc. portable ant.	$49.00
Million V1 10/11 metre ½ wave 3.75 dB	$49.00
VS-10 GH ⅝ wave 10m G.P.	$65.00

HF MOBILE WHIPS AND FITTINGS

AS27MCE 102" S.S. Whip	$14.00
HOPE-10R 10 metre adjustable gutter mounted helical inc. cable and connector	$48.00
HOPE-10B 10 metre adjustable helical equipped with ball mount and spring	$44.00
THUNDERSTICK 108" fibreglass whip	$25.00
GUTTER CLIP for whip tops	$2.90
HOPE-15R 15 metre adjustable gutter mounted helical incl. co-ax and connector	$49.00
HOPE-10RE 10 metre whip top only (as used in Hope-10R	$29.00
HOPE-15RE 15 metre whip top only (as used in HOPE-15R)	$32.00
CIT-1H 10 metre base loaded, boot or rooftop mount, incl. co-ax and plug	$15.00
CIT-2H 10 metre centre loaded gutter mounted whip, incl. co-ax and plug	$25.00
AS-303 HF Mobile antenna set, centre loaded, incl. heavy duty ball mount and spring	$139.00
AS-NK matching SS Bumper Mount for AS-303	$20.00
DUCK 27 MHz Replacement Ant for 11m Walkie Talkies (12" Flex Helical)	$9.00

FT-7 **New model novice and mobile transceiver, 80-10 m, 20 W, all solid state.**

$TBA

HF MONOBANDERS

204BA, 4 element 20m. Beam	$254.00
203BA, 3 element 20m. Beam	$239.00
VS-20CL 3 elem. W.S. 20m beam, **inc. Balun**	$199.00
VS-11CM 3 element 10/11m **inc. Balun**	$85.00
VS-15CM, 3 element 15m. **inc. Balun**	$128.00
CB-5 5 element 10/11m.	$105.00

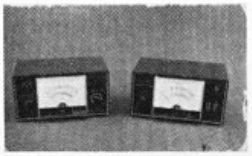
HF DUO BAND

VS-22 3 element 15-11/10m, **inc. Balun**	$173.00

HF TRIBAND BEAMS

TH6DXX, 6-element trap Beam	$345.00
TH3Mk3, 3-element trap Beam	$299.00
TH3Jr, 3-element trap Beam	$210.00
HY-QUAD 2-element Quad Beam	$310.00
VS-33 (Equiv. TH3Mk3), **inc. Balun**	$265.00
DX-33 Western (UK) similar TA-33	$240.00

bail



IES FROM BAIL ELECTRONICS

SCALAR ANTENNAS

HI-MOUND

YAESU

SR

hy-gain

FITTINGS: (Suit all makes with ⅜" x 24 thread)

BPR, bumper mount	$22.00
BDYF, heavy duty adjustable body mount	$24.00
VS-BM Ball Mount & Medium Duty Spring	$20.00
VS-BPM Bumper Mount	$18.00
VS-LBM Ballmount & H.D. Spring	$25.00
H.D. Spring	$18.00
AS-GM Guttermount	$18.00
VS-NGM Guttermount inc. M ring and Co-ax.	$24.00

SWR AND POWER METERS

†**SWFS-2, SWR-40, single meter type,** combined SWR and FS meter, 50 ohms, inc. FS pick-up whip, size 5" x 2" x 2¼". 3-150 MHz, UHF connectors	$23.00
†**SWR-2, FSI-5, dual meters,** 50 ohms. Simultaneous reading of forward and reflected power, 5" x 2" x 2¼". 3-150 MHz, UHF connectors	$32.00
RS-101 Small size SWR meter, with brackets to mount under dash for mobile	$19.50
SWR-200 large dual meters, switched 50-75 ohms, with calibration chart for direct power readings to 2 kW in three ranges. A very elegant instrument. 7⅝" x 2¾" x 3¾"	$75.00
FS-600A Peak Reading Wattmeter SWR meter 20, 200, 500 and 1000 watts 230 VAC operation. 3.5-30 MHz, very accurate	$78.00
FS-301 Wattmeter/SWR meter 20, 200 and 1000 watts 3.5-30 MHz	$55.00

† Type numbers may vary.

ANTENNA COUPLERS

HC-75 Tokyo Hy-power labs. Trans-match 75w PEP	$75.00
HC-250 Tokyo Hy-power labs. 250w	$92.00
HC-500 Tokyo Hy-power labs. Trans-match 500w PEP	$112.00
HC-500A Tokyo Hy-power labs. inc. 160mx 500w PEP	$119.00
HC-2500 Tokyo Hy-power pep trans. Trans-match 2.5 kw PEP	$256.00
KW E-Zee Match	$109.00
KW-107, inc. SWR, dummy load and switch	$268.00
KW-109, inc. SWR, dummy load and switch, 1.5 kw	$360.00

VHF ANTENNAS

23, 3-element 2m Beam	$25.00
VS-2GH 2m ⅝ wave ground-plane	$39.00
VS-6D 4-element 6m Beam	$63.00
VS-6GH 6 metre ⅝ wave G.P.	$43.00
ARX-450, 435-450 MHz three half wave 6dB Ringo	$45.00
432-15H 15-element 430-440 MHz Beam	$47.00
VS-2GL 7 element 2m Beam	$42.00
VS-21L 9 element 2m Beam	$58.50

VHF MOBILE ANTENNAS

AS-2HRF ⅝-wave cowl mount type	$54.00
AS-6RD 6m centre loaded SS whip with gutter mount	$24.00
VS-07MG 70cm Mag Mount ¼ wave	$19.00
HOPE-2R 2 metre gutter mounted helical, only 22 cms long, incl. co-ax 2 connector	$26.00
VS-TOWN 2 metre flexible helical	$19.50
HU-2HR 2 metre Hidaka ⅝ wave gutter mount incl. co-ax and connector	$44.00

SCALAR MOBILE WHIPS

M-22T ¼ wave 2m whip top	$6.50
M-25 ⅝ wave 2m whip top	$16.50
M27-R60T 5ft. 11m. C.L. whip top	$21.05
M-40T 4.5 dB Gain, 435 MHz	$19.80
M.B. Standard base	$4.70
M.B. UHF base	$5.80
MAGBASE inc. 12ft. of RG-58/AU	$49.00

ANTENNA ACCESSORIES

LA-1, Lightning Arrestor, for installation in standard 52 or 72 co-axial feedline, designed to Mil. specs.	$76.00
LA-2, smaller size co-ax arrestor	$4.95
BN-86, ferrite Balun, 2 kW, for Beams and Doublets	$30.00
VS-BN ferrite Balun 2 kW for Beams and Doublets	$26.00
VS-BN4, similar VS-BN, 300 ohms	$26.00
BA-1 ferrite Balun 2 kW 1:1, light weight	$22.00
HN31 Dummy Load Cantenna Kit 1 kW oil cooled (oil not included)	$45.00
FF-50DX Low Pass Filter, 3 Section, 1 kW	$39.00
LP-7 TVI Filter low power	$14.00
KW Electronics L.P. Filter, 5 Section, 1 kW	$59.90
TV-3300 Drake L.P. Filter, 3 Section, 1.5 kW	$39.00
TV-42 Drake L.P. Filter, 3 Section, 300 W	$25.00
TV-476 Hy-Gain L.P. Filter, 150 W	$19.00
TV-75 Drake High-pass filter	$22.00
Porcelain Egg insulators	50 cents
WIDE RANGE of Co-axial cable and connectors in stock. K-20 70 ohm Twin feeder	36 cents per yd.
Multi-band dipole traps centre insulator, 80-10m bands per pair, complete with insulator, KW $38.00, Western	$35.00
590G B & W co-ax. switch, 5 posn., rear entry	$39.90
CX-3, 3 position co-ax. switch, side entry	$12.00
KW 3 position co-ax. switch, side entry	$28.00
ASW-1, Western 5 position co-ax. switch, side entry	$33.00
RS-107 Transceiver tester	$68.00
RS-501 Ant. Impedance bridge, inc. 1 osc.	$72.00
Extra Osc. for RS-501	$16.00

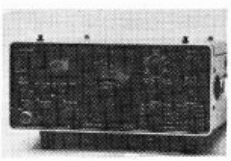
ROTATORS

Emotator:

103LBX Similar to CD-44	$148.00
502CXX Similar to Ham II	$219.00
1102MXX Heavy duty	$325.00
1211 Mast clamp for 103LBX	$18.00
1213 Mast clamp for 502CXX	$29.50
300 Mast Stay bearing for above	$32.00
301 Tower top bearing	$32.00

VCTF-7, 7 core cable (for 1100 series)	$1.20 per m
VCTF-6, 6 core, for 102 & 501	$1.00 per m
1103MXX Extra Heavy Duty	$339.00
1215 Mast clamp for 1102/3	$45.00
Flexible coupler	$32.00

bail



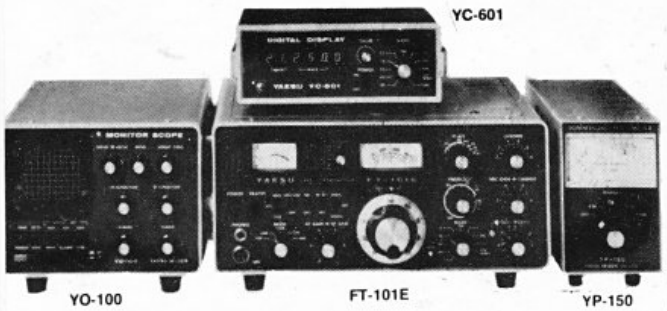
YAESU AMATEUR EQUIPMENT

Now an addition to YAESU'S range of measuring instruments . . .

QTR-24
24 hour World Clock


QTR-24

Yaesu has now made an addition to their already well known range of measuring instruments, it is the QTR-24, a 24 hour World Clock. With a glance the time in any principal city or time zone can be simultaneously co-ordinated with local time on a 24 Hour basis. The QTR-24 is powered by a 1.5V dry cell, which has a normal life of approximately one year. No amateur or SWL station could be complete without one.



Also shown in the photograph is the YO-100 monitorscope, FT-101E transceiver, YC-601 digital readout adapter and YP-150 dummy load-power meter.

OTHER ACCESSORIES

EKM-1A Audio Morse CP Osc with speaker, one transistor, and tone control, requires one UM3 cell, in metal case 3⅝" x 2½" x 1⅛" **$14.00**

TC-701 Morse Practice Osc. with built-in key and spkr. Inc. battery and auxiliary earpiece. Copy of morse code on case. Two can be wired together to form a practice communication set **$19.00**

Model 703 24 hr. Digital Alarm Clock, 230V AC (Copal) **$26.50**

MORSE KEYS

EK-127 Electronic Keyer **$99.00**

EK-150S Single Paddle Electronic Keyer **$136.00**

EK-150D Double paddle electronic keyer **$136.00**

MK-1024 Programmable Keyer, 1024 bit memory . . **$233.00**

HI-MOUND

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A TWO-TONE OSCILLATOR FOR SSB TESTS

N. Cooper VK4ZNC
5 Cahill St., Strathpine 4500

Most amateurs these days have SSB equipment for the HF and VHF bands. Because of the way SSB power is measured it is not really easy to check the true PEP output of a transceiver. But it is not really difficult to build a test oscillator as described, and the measurement then becomes quite simple.

The figure for output power quoted in the transceiver handbook may be incorrect or misleading, e.g. my FT620 six metre unit handbook quotes the output power as 20W DC input on SSB. That doesn't mean very much to me. The only way to measure the power correctly on SSB is to apply two tones, non-harmonically related, to the transmitter. Then measure the RMS power produced at the output, ensuring that the output waveform is not distorted due to overdriving of the linear amplifiers. This RMS power is then doubled, after applying a correction factor, to give the peak envelope power. The reason for the correction factor is that the waveshape being measured is not a sine wave and most power meters are calibrated to read sine wave power only. The correction formula is:—

PEP (in watts) = TWO TONE RMS POWER $(\pi/2)^2$
= TWO TONE RMS POWER $\times$ 2.467

So the RMS power meter only reads 0.81 of the true 2 tone RMS power.

Another method of measuring the true two tone RMS power is to insert an RF ammeter in series with the load. Then apply the formula P(RMS) = I^2R. This figure is then doubled to give the PEP. Thermocouple type RF ammeters read the RMS current irrespective of waveshape.

Most of us probably don't own a CRO so it is difficult to know when maximum undistorted output power is being obtained. A compromise method is to increase the tone drive until the output power starts to flatten off as read on a power meter. Back off the drive a little and then read the power. Then apply the previous formula to obtain the PEP.

THE OSCILLATORS

The circuit shown produces two tones with frequencies of about 800 Hz and 1.8 kHz. The two oscillators are the phase shift type. This circuit was chosen for simplicity. The Wien bridge requires more components and two transistors. Any form of LC type oscillator requires bulky transformers or coils. Two 100 ohm potentiometers are inserted in the emitters of the oscillators to adjust the gain of the stages so that oscillation just occurs. At this point minimum distortion will be produced. I measured the distortion at the output amplifier stage at about 1.5 per cent, which is good considering the simple oscillator circuits used.

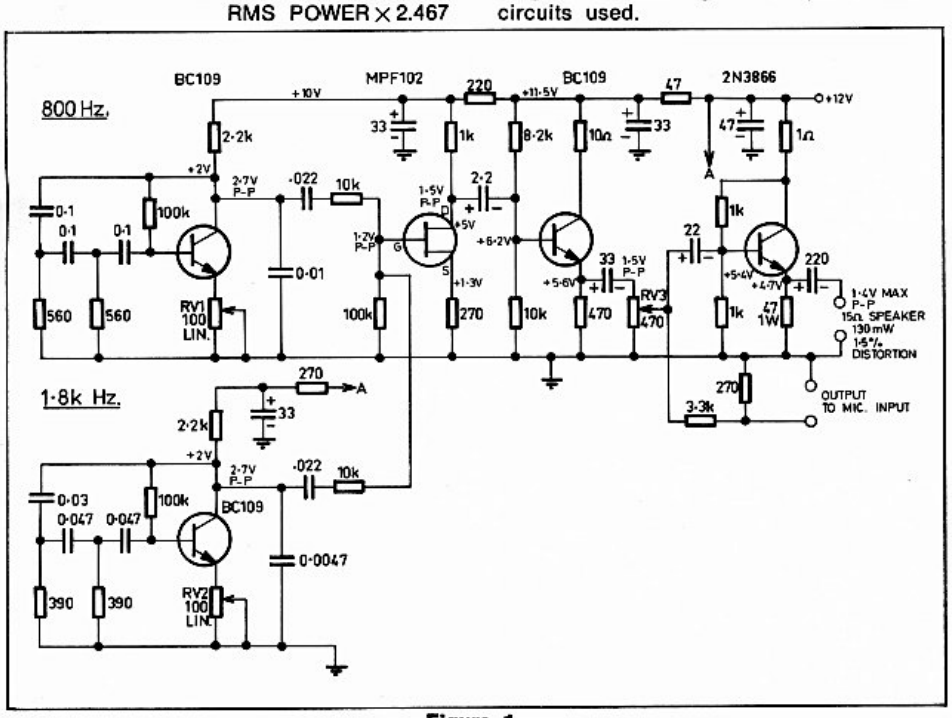


Figure 1

THE MIXER STAGE

The outputs of the two oscillators are combined on the high impedance input of the MPF102. This enables high values (10K) of isolating resistors to be used. The FET has an unbypassed source resistor which keeps distortion low due to negative feedback. The overall gain of the stage is low but little gain is required.

THE AMPLIFIER STAGES

The modern thing to do would be to use an IC, but most ICs require quite a few external components. The circuit chosen uses discrete components and is probably no more complex to build than an IC type amplifier. Both stages are emitter followers. The first provides a low output impedance to drive the PA stage and also gives an output via a pad to insert into the microphone socket of the transmitter, the drive level being adjusted by RV3. The PA stage provides enough power to drive a speaker to monitor the tones. Because it would have complicated the circuit more I avoided complementary symmetry in the output stage. A transformer could be inserted in place of the 1 ohm collector resistor to obtain more power out if required. The emitter resistor would then have to be bypassed of course. More output power may be required if you wish to inject the tones acoustically into the microphone. I wouldn't recommend this way of doing it myself. The PA transistor requires a small heat sink.

CONCLUSION

With this little device and a power meter you should be able to measure the PEP output power of all your SSB rigs.

PCBs will be available from me for anyone interested in constructing the unit. ■

THE WIRELESS INSTITUTE
OF AUSTRALIA
HOPES THAT ALL READERS
AND MEMBERS
WILL HAVE A SAFE AND
HAPPY CHRISTMAS
AND A PROSPEROUS
NEW YEAR
ESPECIALLY IN THE FIELD OF
AMATEUR RADIO

BOX HILL TECHNICAL COLLEGE DISPLAY AT EASTLAND (VIC.)

The Box Hill Technical College staged a major display in the Eastland Shopping Centre at Ringwood from Monday to Saturday, 1st-6th August. The display showed all departments of the College and the work covered in all of the courses offered.

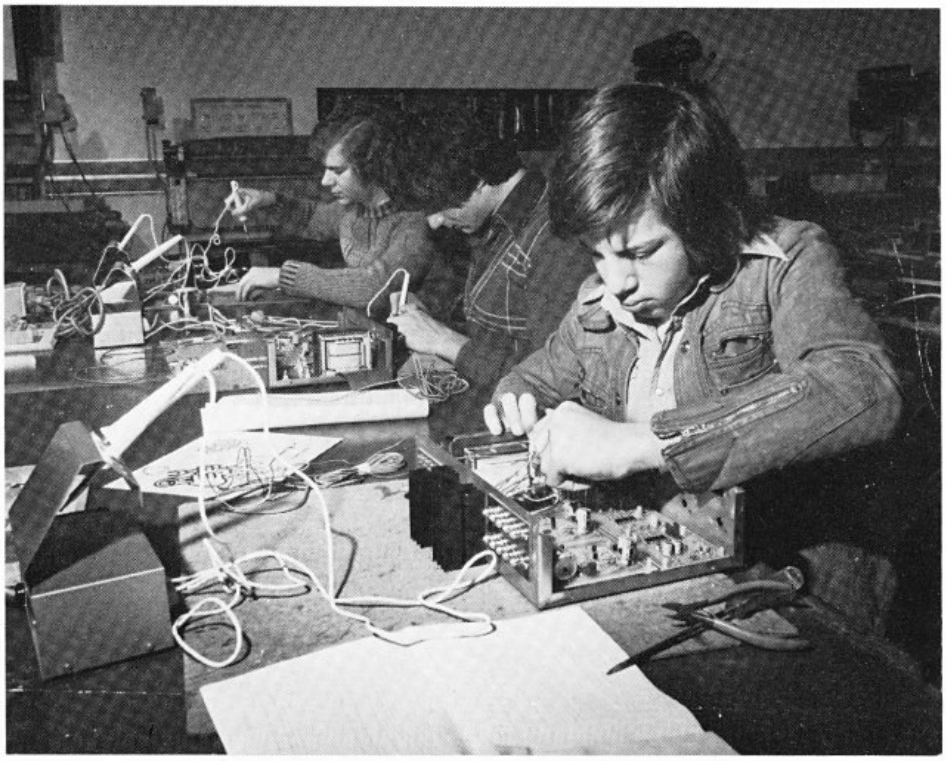
Whitehorse Girls' Technical College combined with Box Hill in the display and staged, among many other exhibits, a mannequin parade, showing off clothes that the girls had made.

The College Radio Department set up a portable amateur radio station at the display. An FT200 was used with a 14 AVQ trap vertical to cover 40, 20, 15 and 10 metres and an IC22a was used with a 5/8th ground plane to cover 2m FM. Many contacts were logged and the best DX was with some K5 stations in the USA. We proved a trap vertical antenna works well if it is mounted on a good ground plane — the building is 100 ft. high and is aluminium sheet! A large pile of Amateur Radio magazines were taken by the public so a fair amount of positive promotion of our hobby must have been made.

Many CB operators learned how orderly operation on amateur frequencies is, and this can only enhance the prospect of more potential amateurs graduating up from CB operation.

Beside the amateur station was a display of kits which students build in various classes conducted by the Radio Department. The kits, which sparked a lot of public interest, include a 25W stereo amplifier, an AM/FM tuner with four push button pre-selcted FM channels, a multimeter, and a "testmaster" — universal test instrument.

Incidentally, the FT200 caused TVI in a TV store in the Centre and the old faithful high pass filter inserted into the store's antenna system cured all TVI. ■



Attentive Students assembling 25W Stereo Amplifier

Graeme Scott VK3ZR, and Helen Gardner manning the Display

HISTORICALS

The Institute is very interested in acquiring and preserving documents and equipment of historical interest.

The Federal Historian, Mr. Maxwell Hull, possesses a great amount of books, papers and other documents acquired over the years and from time to time endeavours to research the material to write articles of historical interest. Each Division also has arrangements to preserve items of historical interest.

The trend these days is that all such items are deposited in suitable local museums for future preservation. The problem of data retrieval needs to be overcome though.

Institute members are strongly urged to persuade older amateurs to go through their radio amateur material for donation to the Institute before it is too late. In many cases valuable items are thrown on to the garbage tip by estate executors possessing no knowledge of amateur radio or interest in it.

Another area of preservation relates to old recordings, which are being collected by Mr. Chris Long. ■

BAND PLANS—INTERNATIONAL AND LOCAL

Bands	(All frequencies in MHz) CW only	CW & Phone
80m	3.5-3.535	3.535-3.7
40m	7.0-7.03	7.03-7.15
20m	14.0-14.1	14.1-14.35
15m	21.0-21.15	21.15-21.45
10m	28.0-28.2	28.2-29.7†

† Beacons 28.2-28.25.

RTTY 3.62, 7.04, 14.09, 21.09, 28.1, 52.075, 144.075, 432.075.

WICEN Nets, identified — 3.6, 7.05, 14.100 **primary.**

WICEN Nets, identified. **Secondary**—CW: 3.575, 7.025, 14.075. Phone: 3.625, 7.075, 14.125.

6m	52-52.01	EME.
	52.01-52.1	DX (52.01-52.05 CW only).
	52.1-52.3	All narrow band modes.
	52.3-52.5	Beacons (Pri. and Sec.).
	52.5-53.1	Simplex nets.
	53.1-54.0	General.
2m	144-144.01	EME.
	144.01-144.1	DX (144.01-144.05 CW only).
	144.1-144.4	All narrow band modes.
	144.4-144.6	Beacons (Pri. and Sec.).
	144.6-145.7	General.
	145.7-146.0	Satellites.
	146.0-148.0	FM simplex and repeaters.
70cm	420-432	ATV (Sound on 431.75) (Video 426.25).
	432-432.01	EME.
	432.01-432.05	DX-CW.
	432.05	Meteor scatter.
	432.05-432.1	All narrow band modes.
	432.1-432.4	Tunable, all modes.
	432.4-432.6	Beacons (Pri. and Sec.).
	432.6-433	Tunable, all modes.
	433-435	FM repeater inputs (433.75-434.25 FM simplex).
	435-438	Satellites (International).
	438-440	FM repeater outputs (438.75-439.25 FM simplex).
	440-443	Experimental.
	443-450	ATV (Sound on 449.75 (Video 444.25).

NOTES:

1. **FM** calling frequencies — 146.5, 439.0.
2. **CW** calling frequencies — 52.025, 144,025, 432.025.
3. **SSB/AM** calling frequencies — 52.1 (52.2), 144.1 (144.2), 432.1 (432.2).
4. SSTV — 3.735, 7.040, 14.230, 21.340, 28.670 Calling frequencies — 52.3, 144.3, 432.3.
5. **Satellite** frequencies — 29.4-29.55 (downlink), 145-146, 435-438.
6. **Meteor Scatter** — 52.05, 144.05, 432.05.
7. **Novice Licensees** —

CW only	Phone & CW
3.525-3.535	3.535-3.575
21.125-21.15	21.15-21.2
28.1-28.2	28.2-28.6

8. The following frequency channels have been approved for use in stations of the Citizens Band Service —

Channel	Freq. MHz	USA Channel No. equivalent	Comments
1	27.015	5	
2	27.025	6	
3	27.035	7	
4	27.055	8	
5	27.065	9	Emergency calling
6	27.085	11	Calling
7	27.095	—	
8	27.105	12	
9	27.115	13	
10	27.125	14	
11	27.135	15	
12	27.155	16	
13	27.165	17	
14	27.175	18	
15	27.185	19	
16	27.195	—	
17	27.205	20	
18	27.225	22	

The emissions permitted are A2, A3, A2H, A3A, A3J, A3H and the Tx output power 4W (Pm) and 12W (Pp). All transmissions on the above frequencies are to cease on 30th June, 1982 (para. 1.1 of the CB Conditions, Form RB14).

9. The Citizens Radio Service UHF frequencies begin as channel 1 on 476.425 MHz increasing by 25 kHz steps to channel 40 on 477.400 MHz. The emissions permitted are F2 and F3 and Tx output power 5W (Pm). Channels 1 to 10 (476.425 to 476.650 MHz) and 36 to 40 (477.300 to 477.400 MHz) may be used without restriction but the remaining channels 11 to 35 will be available at a date to be announced. There is no expiry date for UHF channels. ■

TRANSVERTER MODEL MMT432/144

UTILIZING an IF of 144 MHz ★ 10 WATTS DRIVE or ½ WATT ★ VOX OPERATED

This 432 solid state linear transverter is intended for use with a 144 MHz transceiver to produce a high reliability transceive capability. A 10 watt load and RF sensing network eliminates the need for any ancillary circuitry. A single coaxial connection is all that is required between the transverter and the associated 144 MHz transceiver.
A wide range of applications is offered by this MMT432/114 transverter, which by virtue of its linear mode of operation will enable 144 MHz SSB, FM, AM or CW equipment to be used at 432 MHz.

Simply connect direct to your 2 metre rig, 12 volt supply, fit 70 cm antenna for instant SSB, FM, AM, CW operation.

FEATURES: High quality double-sided glass fibre printed board ★ Highly stable zener controlled oscillator stages ★ PIN diode aerial changeover relay with less than 0.2 dB through loss ★ Extremely low noise receive converter, typical 3 dB ★ Separate receive converter output gives independent receiver facility ★ Built in Automatic RF VOX with override facility ★ Built in 10 watt 144 MHz termination, selectable attenuator for ½ watt ★ Use of the latest state of the art Power Amplifier transistors provide reliable 10 watts continuous output.

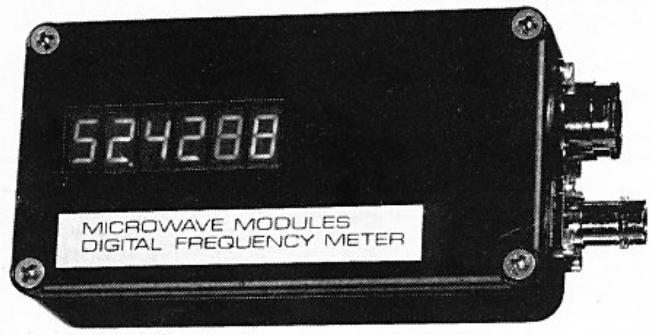
MODEL MMT432/144 — Price $260

NEW RELEASE – TRANSVERTER MODEL MMT432/28S

Features extended coverage for Oscar 8.

Second Crystal Oscillator gives two ranges: Low, 432-434 MHz — High, 434-436 MHz. Programming available to either Transmit/ Receive both Low, both High, or a mixture of the two. Adjustable Drive Level is now provided by an input potentiometer. Optional RF VOX.
Power Output 10 watts minimum ★ 28 MHz IF ★ Drive 1 mW to **500** mW ★ Aerial Changeover by PIN diode switch ★ Modern microstrip Techniques ★ Power requirements 12 volt nominal at 0 mA 2.5 amp. peak ★ Case size 187 x 120 x 53 cm ★ Spare 432 input socket.

MODEL MMT432/28S — INTRODUCTORY PRICE: $235.



MMT432 TRANSVERTER

500 MHz COUNTER

SPECIFICATION

Digit Height	10 mm
Display Width	45 mm
Case Size	111 x 60 x 27 mm
Frequency Ranges	0.45 - 50 MHz, 50 - 500 MHz
Sensitivity	Better than 50 mV RMS over 0.45 - 50 MHz. Better than 200 mV RMS over 50 - 500 MHz
Input Connector	50 ohm BNC
Input Impedance	200 ohm approximately
Power Connector	5 pin 270 deg. locking DIN socket (supplied with plug)
Power Requirements	11 - 15 volts DC at 300 mA approximately

Model MMD050/500 — 500 MHz Counter, $175

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FOR 70 CM — 90-100 WATT

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New Release — 6 METRE MOSFET CONVERTER

FEATURES 24 MHz LOCAL OSCILLATOR OUTPUT FOR TRANSVERTER USE.

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Typical Gain: 30 dB
Noise Figure: 2.5dB
Typical image rejection: 65dB
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MODEL MMC52/28LO — Price $49.00

2 METRE VERSION — WITH 116 MHz LOCAL OSCILLATOR OUTPUT FOR TRANSVERTER USE.

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1296 MHz CONVERTER
Microstripline, Schottky diode mixer. IF: 28-30 MHz or 144-146 MHz. Noise figure: typ. 8.5 dB. Overall gain 25 dB. **Price: $65**

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All modules are enclosed in black cast-aluminium cases of 13 cm by 6 cm by 3 cm and are fitted with BNC connectors. Input and output impedance is 50 ohms. Completely professional technology, manufacture, and alignment. Extremely suitable for operation via OSCAR 7 or for normal VHF/UHF communications.

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HIGH SPEED MORSE

G. Thompson VK3AC
78 Illawarra Road, Hawthorn, 3122

The morse keyboard has added a new dimension to amateur radio. It was inevitable that computer technology would eventually find applications in the field of amateur radio. It has in fact been responsible for a major breakthrough in CW telegraphy.

Several commercially built keyboards are available in the United States. For VK hams the main source of morse keyboards has been Alan VK2BF, who developed the first home-brewed keyboard to be built in Australia. During the past year Alan has been responsible for about eighteen enthusiasts becoming keyboard operators.

Alan has also been the main inspiration behind the CW Net which operates on the 7 MHz band every Sunday morning between 10 a.m. and midday. The Net Control Station will be found on 7025 MHz and an average of about 25 CW operators participate to produce a net which, after two hundred and eighteen session, has become a very efficient team.

Those who have graduated from the PMG type key through various types of side-swipers and bugs to the electronic keyer have been able to reach sending speeds of up to 38 words per minute. But at that speed we still need to make considerable demands on our reflexes, which tend to slow down as the years go by for us. The arrival of the morse keyboard has lifted operating speeds to as high as 70 words per minute for several groups of American hams.

It was mainly as a result of listening to a 50 words per minute net of W stations and then reading what appeared to be authentic reports about speeds of up to 70 words per minute being used that I decided to try to bring my own receiving speed up to something approaching 50 words per minute. With a Barlow Wadley receiver I searched the entire HF spectrum looking for suitable signals to copy for practice but could find nothing. It wasn't like the old days when one could copy KTK which every day sent press to the Robert Dollar line of ships at sea. It appeared that I would have to produce my own fast morse for receiving practice.

This was done by recording text at 25 words per minute and playing it back on a two speed recorder at twice the recorded speed. This 50 words per minute material was for convenience re-recorded on cassette to produce two solid hours of fast morse. With this quantity of copy there wasn't much chance of memorising the text. I have found that the tapes could be used for several months to bring up the receiving speed until one hundred per cent copy was possible. When recording at 25 words per minute the pitch of the audio source should be one octave lower so that the pitch of the fast replay does not go an octave higher.

For several months whenever any spare time was available the tapes proved their worth. Jack VK2YK has since reported, six months later after having a QSO with one of the American speedsters, that this has been the method used by them also to reach 70 words per minute. But in addition some have been using video readout. The result has been to produce a number of operators who can send at 70 words per minute on their keyboards and copy at the same speed in their heads.

I have satisfied myself about the 70 words per minute claims because I am at the moment listening to 60 words per minute tapes, having broken through the 55 words per minute barrier.

High speed keyboard morse has been an exciting development for the CW enthusiast, but it brings with it a number of problems which are not apparent at slower and more conventional speeds.

The question of weight becomes important and this must be light enough to permit each character to be formed at high speed with sufficient clarity to be read at the other end. Keying shape should be adjusted with suitable filters to achieve rise and decay times of about five milliseconds when the keying circuit is closed and opened. The ARRL handbook shows oscilloscope photographs of dots generated at a speed of 46 baud. Such a shape will be free from clicks and thumps and will be sharp enough to reproduce keyboard created morse up to 70 words per minute.

If the keyboard is equipped with a memory or "buffer", as it is called, the process of learning to use it will be greatly simplified, as the letters and words are automatically spaced correctly. Without the buffer, the differences in the duration of the various letters of the alphabet require a considerable amount of skill when typing to achieve accurate spacing. On the other hand, when my XYL tried out my keyboard, fitted with a buffer, for the first time she was able immediately to send perfect morse at 40 words per minute despite the fact that she does not know the morse code.

High speed morse begins to approximate a sideband QSO when full break-in is used. Some operators are using partial break-in by keying with the VOX circuit holding the relay in for groups of words or even for single words. With full break-in it is possible to hear the break immediately between the dots and dashes of one's own transmission regardless of the speed being used.

To achieve full break-in an independent receiver is essential. Using a Drake 2B receiver and two relays I was able to convert to full break-in. A 12AU7 was used as a relay control tube. This was biased to cut-off. Keying removes the bias and actuates the relays. One relay is a miniature type which has a make speed of 2 milliseconds. This relay removes the antenna connection from the receiver and also shorts the receiver antenna terminal to ground. A second pair of contacts brings in a potentiometer which is adjusted to match the level of one's own signal to that of the station being worked. This potentiometer is connected to the receiver's AVC circuit. The second relay is a miniature

reed type with a make speed of one millisecond. This relay is mounted near the receiver third mixer stage and it switches a capacity across the 50 kHz intermediate tube plate circuit inductance to detune the circuit reducing the signal to a level that can be handled by the product detector and AVC circuit regardless of the transmitted power being used. If the miniature relay fails to function there is always the possibility of receiver damage by RF from the transmitter. But according to the maker's specification for the relays they should operate for many years without replacement. The miniature relay is a plug-in type which is easily replaceable at a present cost of about $4. The relays key well up to 72 words per minute, which is the maximum speed of the keyboard being used.

When listening to high speed morse, earphones should be used preferably because room reverberation and the phase differences of sounds picked up by the two ears can result in a blurring of the characters. Moving away from a loud speaker when copying 50 words per minute Morse a point is reached where the characters will merge and become almost a continuous sound.

It has been quite surprising how often QRQ keyboard QSOs have been deliberately jammed. It's difficult to imagine what must be going on in the minds of the jammers, but giving them the benefit of the doubt, my only conclusion is that the high speed morse signals have been mistaken for commercial intruders.

In setting a speed goal for increasing morse receiving speed the source material should always be about 5 words per minute faster than the present maximum readable speed. As each goal is achieved the speed should be advanced another 5 words per minute. By the time you reach 45 words per minute you will be recognising the shape and sound of complete words rather than the dots and dashes with which they have been formed.

When sending QRQ morse abbreviations should preferably be avoided. If you are sending at 50 words per minute there should be no real need to abbreviate and it is always easier to copy a complete word at high speed than an abbreviation.

There's not much fun in QRQ morse rag chewing if you have to write it all down. At the high speed now achievable with the keyboard the morse really becomes another language which has to be learned over a period of time. So eliminate the pencil and set out to learn the new language.

If you want to go keyboard you can make a good start by putting together some QRQ tapes and setting out to bring up your receiving speed. Cassette recorders suitable for CW practice can be obtained for as low as $35. Don't need a high fidelity job for this purpose. Even if you cannot yet copy at QRQ QSO on the bands, you can tape it and use it for future practice. At the same time you can learn the keyboard technique by borrowing a typewriter and practising ordinary typing. By the time you reach forty words per minute on the "mill" and have brought your receiving speed up to the same level you will be able almost immediately to go on the air with a buffered keyboard.

So here's to the future success of the keyboard revolution which is helping to keep CW telegraphy alive in the amateur bands. ■

EDISON AND HIS CONTRIBUTIONS TO WIRELESS

M. R. Haskard, VK5BA
Karwin Rd., One Tree Hill, 5114

Thomas Alva Edison (1847-1931) was one of the greats in experimental technology. Even though he had only three months schooling and had an acute hearing problem, he devised and perfected many items that we take for granted today. In fact he still holds the record for taking out the largest number of patents by a single individual (over 1000).

It is therefore not surprising that Edison made a number of contributions towards the field now known as broadcasting. This would include his efforts in recording sound (1977 being the centenary of the phonograph), in producing motion pictures and in the generation of electric light (the last two items being relevant to TV). However in this paper, let us examine in some detail three contributions which have been of importance to wireless. They are: (1) the use of a raised antenna; (2) the discovery of a phenomena later to be called the Edison effect and (3) the invention of the carbon microphone.

During the nineteenth century man dreamed of sending electrical signals from one place to another without using wires. For example Sir Samuel Morse in 1840 sent electrical impulses for a mile or so through water and for several hundred feet through the earth without wires.

In November 1875, Edison claimed to have discovered a "new force" which he later named "etheric force" because it seemed to diffuse itself through the air. There was considerable discussion in engineering and scientific journals of the day on this discovery. Fig. 1 shows diagrammatically the "equipment" used in one of Edison's experiments demonstrating this discovery. On operating what we might today call the "buzzer", sparks could be seen in the black box showing the passage of a current and yet there was no return path for the current. Edison and Dr. George Beard independently showed that it was due to a very high frequency oscillation.

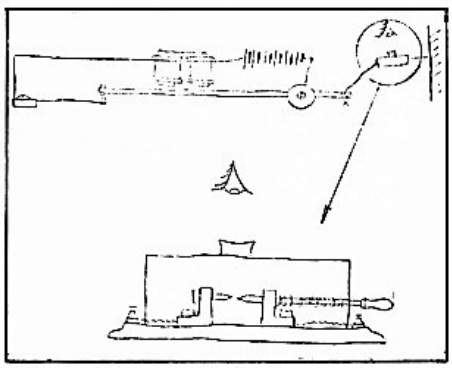

FIG. 1. Edison's etheric force experiment. Bottom sketch shows details of the black box with micrometer adjustment.

It was not until 12 years later in 1887, when Prof. H. Hertz proved the existence of electro-magnetic waves in free space, that the situation became clear and Edison realized that the fundamental principle of aerial telegraphy had been within his grasp. Without reducing the importance of Hertz's work it has been noted that Edison's staff demonstrated the "etheric force" experiment at the Paris Exposition in 1881 and that Hertz used equipment similar to Edison's, especially his dark box with micrometer adjustment.

However, two years before Hertz, Edison, with Ezra T. Gilliland, devised a device to allow someone travelling across the Western Prairies by train to telegraph out and receive messages whilst still in motion. This they called the space telegraph or grasshopper telegraph. The system was shown to work, patented on May 14th, 1885, but never put to any practical use.

A variation of this system allowed Edison to send telegraphic messages without wires a distance of 2½ miles. (His notes indicate that as far back as 1880 he had used a similar inductive telegraph to send messages 580 feet.) He used 100 feet high masts to overcome the curviture of the earth, with large metallic plates located at the top (Fig. 2). The system has been called an electro-static generator, the plates on the masts acting as a condenser for the air in between the dielectric. Confusion exists today as to whether the system worked or not — the problem lying not on the transmitter side but in the receiver. it is interesting to note that in May to July 1901, an engineer E. Guarini took Edison's system, replacing the telegraph receiver by a coherer and worked distances of 26 miles or so between Brussels, Mechlin and Antwerp. (Comparing Edison's transmitter with Marconi's, apart from the fact that Edison used very much lower frequencies, there is very little difference between them.)

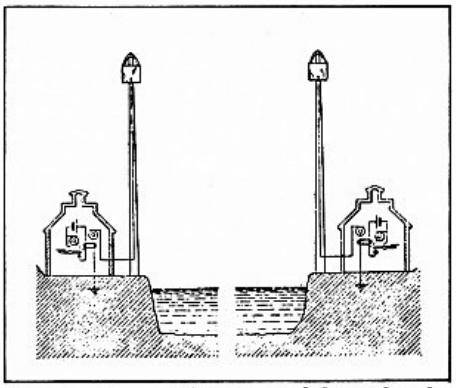

FIG. 2. Means for transmitting signals electrically.

Perhaps the important aspect of Edison's system and patent, was the aerial masts. Marconi in 1903, along with other opposition experimenters, approached Edison to buy his patent. Edison, who had a deep admiration for Marconi, stipulated that the patent was to go to Marconi rather than any others, and so in 1904 the patent was sold to the Marconi Radio Company.

Turning now to Edison's second contribution. Whilst studying the physical and chemical reactions which took place in an evacuated glass bulb containing a glowing carbon filament, Edison noted a blackening of the bulb by a deposit. This he records on February 13th and 18th, 1880. Further, he also noted that the bulb in the plane of the filament connected to the positive side was not blackened, leaving a clear patch as if a shadow had been cast.

Following the matter further, Edison, in July 1882, designed a 2-element bulb where he inserted a platinum wire between the horseshoe shaped filament. This wire was brought out separately so that the electrical condition of the inside of the bulb could be examined. To his surprise he found a current flowed when this wire was connected to the positive polarity but not to the negative (see Fig. 3 (a)). Other shaped electrodes were used giving the same result. This was a discovery of great importance, that a current could flow through a vacuum. In true Edison fashion he immediately set out to apply his discovery and designed an electrical regulator. This he patented on 15th November, 1883 (see Fig. 3 (b)). The device was not really successful, probably due to difficulties in producing consistent vacuums, and being over-worked with his electric light system, he had no time to follow things through. However, his device was the first electronic instrument — a voltage regulator, and it was exhibited at the International Electrical Exposition in Philadelphia in September, 1884. The British engineer, Sir William H. Preece, saw the display and out of curiosity took back to England several models. In 1885 he presented a paper to the Royal Society calling the phenomena discovered by Edison the "Edison Effect".

Prof. Ambrose Flemming, in London (it appears Edison may have asked his help at this time), tried to improve Edison's 2-element bulb so that it could reliably be used as a regulator. In 1888 he replaced the metal plate electrode with a cylinder surrounding the filament. It worked far better as a rectifier, but again it appears problems in achieving a consistent vacuum limited its uses as a regulator and Flemming gave up.

Marconi, in the years 1895-6, when experimenting with his primitive wireless, used the coherer of Edouard Branly to detect his signals. The discovery of the electron and work by Sir J. J. Thompson in 1897 gave Flemming, who was now a consultant to Marconi, the idea of using Edison's device or the Flemming valve as he himself called it, as a detector. It proved to be a far more sensitive and reliable detector than the coherer and so after 1904 the Marconi Telegraph Company standardise on this detector, obtaining a greatly increased range of communication.

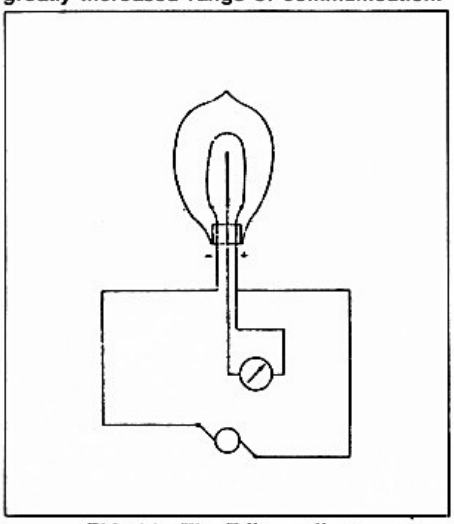

FIG. 3A. The Edison effect.

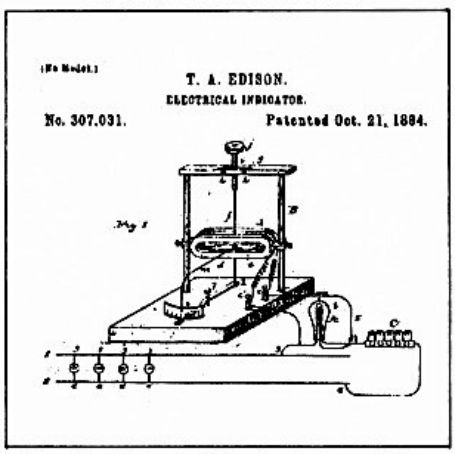

Fig. 3B. Edison's "electronic" regulator.

In just 20 years Edison's 2-electrode bulb had come into its own and until the advent of the transistor in 1948, was the basic element in all electronic communications.

Edison's third major contribution to wireless — the carbon microphone — was really developed for the telephone industry. In June 1875, Alexander Graham Bell first heard the feeble voice of his assistant from his telephone. He patented it and made it public in March 1876. At this time, Edison re-examined a similar device that he had made. (In fact he had lodged a note of intent to patent on January 14th, 1876), and found that it was capable of transmitting sound, though crudely. If only he had had good hearing he would have heard the faint sounds as Bell did. (To "hear", Edison used to bite the instrument with his teeth, allowing the vibrations to be conducted through the bones of his head to the inner hearing nerve.)

Bell's magneto telephone (similar to our dynamic microphones and earphones) had no amplification and so was limited in the distance that it could be used to about two miles. Edison, who had been approached by Western Union to devise an alternative telephone, looked at ways in which the telephone volume could be raised. On 20th January, 1877, he succeeded, using platinum points into carbon granules. From here he produced the carbon microphone and by including a step up transformer he found that he was able to increase the volume still further. The patent was filed on April 27th, 1877. Using the Edison transmitter and a Bell receiver a conversation was undertaken in March 1878 over a distance of 107 miles — in front of the Western Union directors. All were impressed with the loudness of the signal.

With the advent of wireless telephony, it was quickly discovered that the carbon microphone was ideally suited for modulating a valve oscillator. Even with the development of more exotic electronics, the carbon microphone stayed and it was not until the 1950s that this type of microphone was finally superseded in communication systems.

Whilst Edison will always be remembered for his inventions of the phonograph and electric light bulb, I believe his contributions made to wireless are no less significant.

ACKNOWLEDGEMENT

I wish to thank the staff of the S.A. Institute of Technology Library, particularly P. Buxton, for their help in researching material on this subject.

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ELECTRONIC ENTHUSIASTS EMPORIUM

POPULAR INTEGRATED CIRCUITS IN STOCK

CA3012	CD4026	CD4724	LM380N	MC1496K	UAA180
CA3013	CD4027	CD40097	LM381N	MC1590G	UA723C LM723
CA3018	CD4028	CD40098	LM382N	MC14553	UA757
CA3023	CD4029	CD40174	LM387N	MC1648P	ULN2208
CA3028A	CD4030	CD40175	LM395K	MC4044P	ULN2209
CA3035	CD4031	CD40192	LM555CN	OM802	ULN2111
CA3039	CD4035	CD40194	LM555H	SAJ110	74C00
CA3046 LM3046	CD4040	CD40195	LM556N	SAK140	74C02
CA3053	CD4041	DM8097 1.90	LM562B	SD305DE	74C04
CA3059	CD4042	HEF see "CD"	LM565N	SD306DE	74C10
CA3060	CD4043	LH0070	LM566CN	SL415A	74C14
CA3079	CD4044	LM114H	LM567CN	SD425A	74C20
CA3080	CD4045	LM301AN	LM709N	SL437D	74C85
CA3081	CD4046	LM301CN	LM710CN	SL440	74C86
CA3082	CD4047	LM304H	LM710CH	SL442	74C90
CA3083	CD4049	LM305AH	LM723H	SL447	74C154
CA3086 LM3086	CD4050	LM307N	LM723N	SL449	74C160
CA3089E	CD4051	LM308V	LM725N	SL610C	74C162
CA30900	CD4052	LM309K	LM733CH	SL612C	74C174
CA3091	CD4053	LM310N	LM733N	SL613C	74C192
CA3120E	CD4066	LM311A	LM741CH	SL620C	74C901
CA3127E	CD4068	LM311H	LM741CN	SL621C	74C925
CA3128E	CD4069	LM312H	LM747CH	SL623C	80C95
CA3130T	CD4070	LM317K	LM747CN	SL622C	**MISC**
CA3140T	CC4071	LM318N	LM748CN	SL624C	AL5352
CA3600	CD4072	LM319H	LM1303N	SL630C	GL4484
CD4000	CD4075	LM319N	LM1310N	SL640C	GL5253
CD4001	CD4076	LM320K	LM1458N	SL641C	OL31
CD4002	CD4078	LM320T	LM1488N	SL645C	RL4484
CD4006	CD4081	LM322N	LM1489N	SL901B	RL5023
CD4007	CD4082	LM323K	LM1496N	SL917B	FND357
CD4008	CD4085	LM324N	LM1808N	SL1310	FND500
CD4009	CD4086	LM325N	LM3028 CA3028	SL3046	9001
CD4010	CD4093	LM326H	LM3046	SP8505	9368
CD4011	CD4502	LM339N	LM3086	SP8515	9601
CD4012	CD4503	LM340K	LM3900	TAA300	NSN71
CD4013	CD4510	LM340T	LM3905	TBA570	NSN74
CD4014	CD4511	LM349N	LM3909	TBA700	TIL306A
CD4015	CD4514	LM358N	MC1035P	TBA810A	11C90
CD4016	CD4515	LM370H	MC1312P	TB1750A	95H90
CD4017	CD4516	LM371N	MC1314P	TCA220	2102-2
CD4018	CD4518	LM372H	MC1315P	TCA290A	2513N
CD4019	CD4519	LM372N	MC1350P	TCA420A	S1883
CD4020	CD4520	LM373N	MC1351P	TCA580	S50242
CD4021	CD4528	LM374N	MC1454G	TCA730	MA1002
CD4022	CD4539	LM375N	MC1458 LM1458	TCA740	7805CP
CD4023	CD4555	LM377N	MC1468L	TDA1005	7824CP
CD4024	CD4556	LM379	MC1488 LM1488	UAA170	
CD4025	CD4720		In some cases pin for pin substitutes will be supplied.		

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7400	7483	74S258	74LS174	BD238	2N3566
7401	7485	74S196	74LS175	BD437	2N3568
7402	7486	82S23	74LS181	BD438	2N3569
7403	7489	8281A	74LS191	BF173	2N3638
7404	7490	82S90	74LS192	BF180	2N3638A
7405	7491	74LS00	74LS193	BF194	2N3642
7406	7492	74LS01	74LS194	BF200	2N3643
7407	7493	74LS02	74LS195	BFY50	2N3694
7408	7494	74LS03	74LS196	BFY51	2N3731
7409	7495	74LS04	74LS221	BPX25	2N3819
7410	7496	74LS08	74LS253	BSX19	2N3866
7411	74100	74LS09	**SEMICONDS**	BU126	2N4037
7413	74107	74LS10	AC125	MFE131	2N4249
7414	74121	74LS11	AC126	MJ802	2N4250
7416	74122	74LS13	AC127	MJ2955	2N4355
7417	74123	74LS14	AC128	MJ4502	2N4356
7420	74132	74LS20	AC132	MPF102	2N4360
7422	74141	74LS21	AC187	MPF103	2N5245
7425	74145	74LS22	AC188	MPF104	2N5457 MPF103
7426	74150	74LS27	AD149	MPF105	2N5458 MPF104
7427	74151	74LS28	AD161/62	MPF106	2N5459 MPF105
7430	74153	74LS30	AS322	MPF121	2N5485 MPF106
7432	74154	74LS32	AT1138 2N301	MPF603	2N5590 MPF603
7437	74157	74LS37	ASY17	TIP31C	2N5591
7438	74160	74LS38	BC107	TIP32C	2N6027
7440	74164	74LS40	BC108	TIP120	2N6084
7441	74165	74LS42	BC109	TIP125	BA102
7442	74174	74LS73	BC177	TIP141	OA47
7445	74180	74LS74	BC178	TIP2955	OA90
7446	74181	74LS75	BC179	TIP3055	OA91
7447	74185	74LS78	BC182	TT800 2N4037	5082-2800
7448	74190	74LS86	BC212	TT801	40440 2N3731
7450	74177	74LS90	BC327	2N301 2N2869	40637A
7451	74191	74LS92	BC337	2N706A	40673
7453	74192	74LS93	BC547	2N918	40822
7454	74193	74LS95	BC548	2N2222A	40841
7460	74194	74LS109	BC549C	2N2646	BZX61
7470	74195	74LS113	BC559	2N2869	BZX79
7472	74196	74LS114	BC639	2N2904A	BZX70
7473	74S00	74LS151	BC640	2N2905	BZY93
7474	74S10	74LS153	BD131	2N3053	BZY91
7475	74S20	74LS157	BD132	2N3054	PA40
7476	74S74	74LS163	BD139	2N3055	PB60
7480	74S112	74LS163	BD140	2N3564	MEL12
7482	74S251	75LS164	BD237	2N3565	FCD820

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12BY7A	*6939
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*QQE06-40	*6JS6

* Indent only.

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SIMPLE QRP

LOW POWER MORSE TRANSMITTER USING VALVES!

Dave Jeanes VK2BSJ,
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(or MM)

Here's a little two band 12 watt CW rig that features an absurdly easy chassis technique and a simple band changing system. The delights of QRP are many; low cost — in this case around $20, reduced BCI and TVI problems, easy portability and the added pleasure when DX-ing. Everyone will give a QRP station a go; you even become a desirable station to work, especially if you are portable or mobile.

This project started some months ago when an old four valve mantel radio was converted into a two valve CW transmitter. This mantel radio transmitter worked fine and I had many QSO's on 40 and 20 metres with it. However, band changing entailed re-soldering and took half an hour or so. At first opportunity I purchased a cabinet and the hardware necessary for building the rig into an easy to use form, incorporating some improvements I had dreamed up.

The rebuilding job took about twelve hours, and this period would be all the time required for someone starting from scratch.

I chose for the cabinet a mild steel instrument case, 9 x 7 x 6½ inches high, because it was about half the price of more splendid items, and opened at the top only, this aspect suiting the plan for chassis mounting. Although the case is rather big, it allows plenty of room for components and for heat dissipation. The power transformer is mounted on the bottom of the case at the rear centre. This keeps the centre of gravity low. The silicon rectifiers and other power supply components are fitted to a tag strip screwed to the bottom of the case.

If you can come by an old valve radio, a type that uses a 6X4 rectifier will have a very suitable power transformer, which will provide about 300V DC for HT, when rectified by diodes instead of the valve.

As the drawing indicates, the chassis is mounted upside down above the power supply and this inverted position gives total access to all necessary components, for making final adjustments and perhaps for later modifications or trouble shooting. The chassis is a sheet of copper clab fibre board, very cheap to buy, being about $1 per square foot. It is ideal for the job, provides screening of components, is easy to drill and file, and is a delight to solder to, even using a lightweight iron. All tag strips and valve socket lugs can be soldered directly to the copper surface, or items can be re-positioned with absolutely no trouble. The only components below the chassis are the two valves and the coil cans. The coils of course are adjustable from above when the chassis is fitted with the case.

CIRCUIT

In the circuit I wanted a triode oscillator, which would provide plenty of feedback for the old crystals I had. The tuned anode circuit would reduce harmonic output. When switching crystals it is sometimes advisable to have one side of the switch earthed, and the oscillator provides the facility. Twin triodes are easier to come by than single triodes, and in the case of the 12AT7 series, have 12V heaters, a good point when looking at possible battery operation. The fact that I had a spare triode section unused in the original mantel radio transmitter, gave me the idea of using the second triode section as a frequency doubler, so allowing two band operation. It would not require neutralising, being a frequency multiplier, this

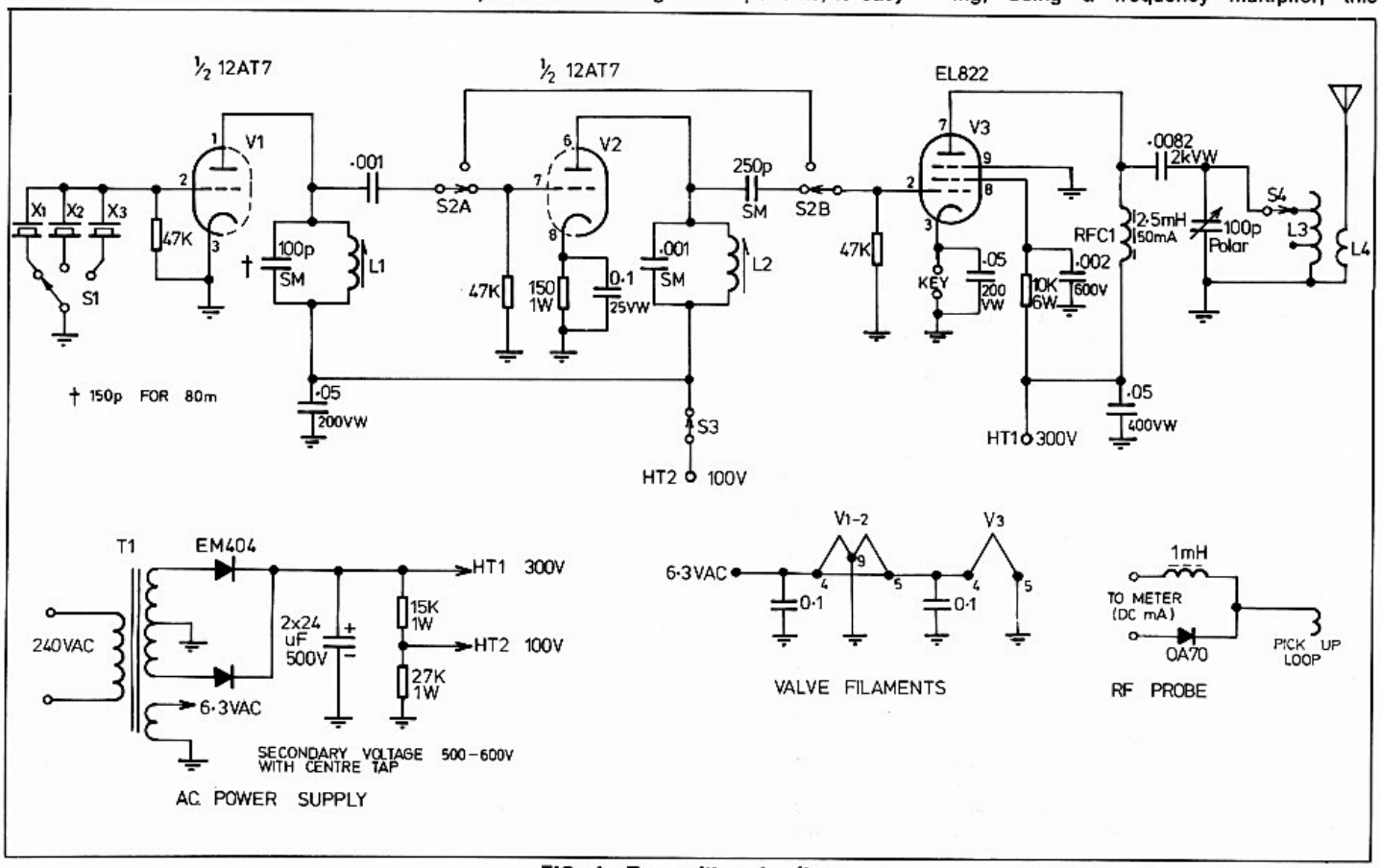


FIG. 1. Transmitter circuits.

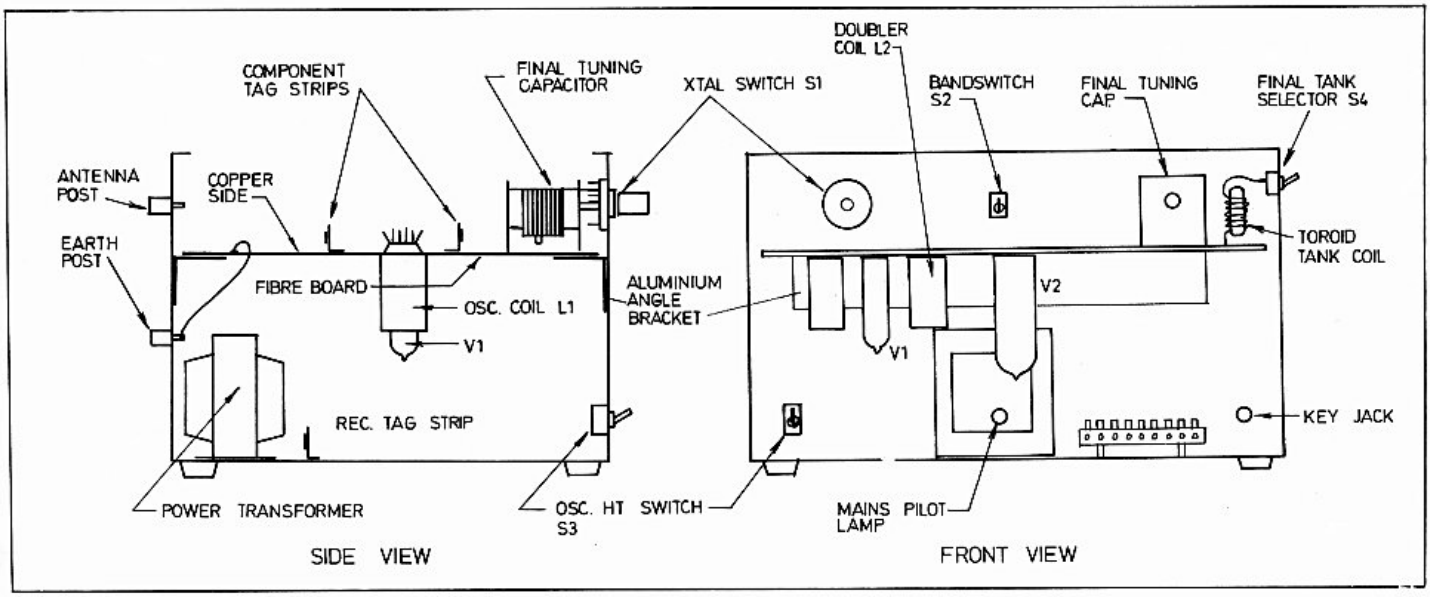
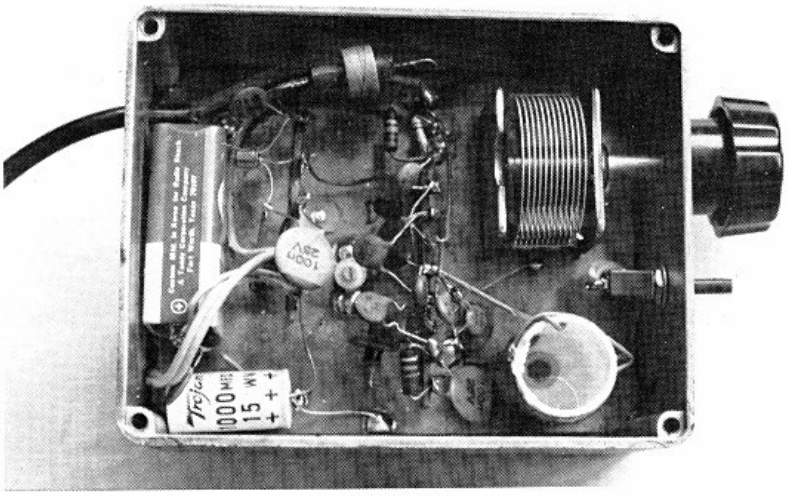


FIG. 2. Side and front views of chassis.



FET VFO.

aspect lending stability to the design. Simplicity being the keynote of this rig, one couldn't get a more simple oscillator.

On the fundamental band (described thus because the rig can be either 80 and 40 or 40 and 20 metres) the output of the oscillator stage is coupled directly to the grid of the final amplifier. I have used an EL822 pentode for the final; this is not a common valve but is similar to the 12BY7 which is easily obtainable and would preserve the 12V heater arrangement if battery operation was desired. Grid leak is adequate for the final, and because of the low power, circuit protecting cathode bias is not necessary. The cathode of the final is keyed, with a shaping capacitor across the key. Pentodes generally do not require neutralising, and good layout plus the use of a ferrite toroid for the plate tank circuit gives a stable output. Shunt feed of HT to the final amplifier is used because the tank circuit tuning capacitor is grounded to the chassis.

To provide a simple matching into an end fed antenna, such as would be used in a portable situation or some home stations, a two turn link is wound around the earthy end of the plate tank coil. This system gets plenty of power into indifferent antennas and requires only one tuning capacitor. End fed antennas of course require a good earth system.

For doubling up to the second harmonic band, the second triode of the 12AT7 is used as a frequency doubler. A DPDT toggle switch performs the band switching here, and as the circuit shows, simply feeds the oscillator output into the grid of the second triode. Its plate is tuned to the harmonic frequency and provides adequate drive for the final amplifier. The toroid tank coil is tapped and a small toggle switch mounted close to the coil change bands.

The oscillator and doubler stage HT is switchable; HT ON allowing netting and transmission — HT OFF is the receive position. No Tx/Rx relay is needed if a separate receive antenna is used. Just turn down the receiver gain during transmit and you will have good sidetone from the beat note.

Band changing is accomplished simply by operating two toggle switches and repeaking the final tank circuit. Going to the receive mode requires only switching off the oscillator HT and turning up the receiver gain.

TUNING

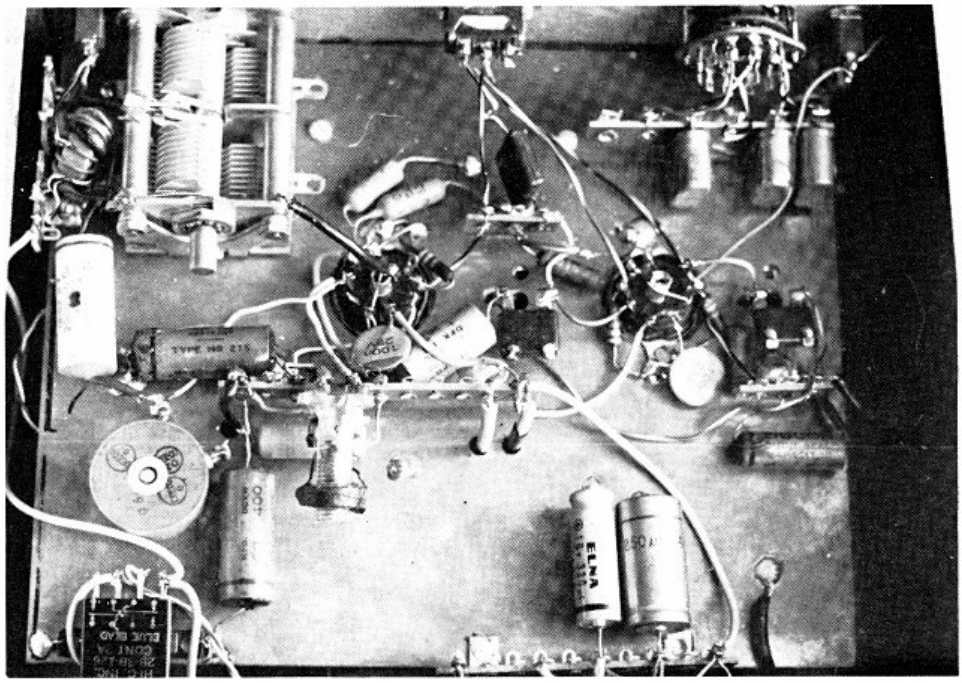
No metering is necessary for tune-up except the RF probe feeding into your multimeter. This is also the only test equipment required for initial tune-up after construction. Couple the RF probe to the oscillator output and tune the coil slug for maximum output on the meter. Back off this reading slightly to ensure reliable oscillator start-up. The doubler tuned circuit is adjusted similarly, using the probe. For tuning the final amplifier, couple the probe to the antenna wire as far away as consistent with reading the meter. Only one or two turns of coupling are needed, insulated wire of course, to get a healthy reading on the 0-1 mA or 0-10 mA scale.

For final tank tuning I have used a 100 pF Polar variable. However on the mantel radio rig the broadcast tuning capacitor worked quite well. The small number of turns on the toroid tank coil amazed me initially and I assumed that I was tuned to a harmonic, but this was not the case. On-air reports from a station less than ten miles away gave me 599 plus on 40 metres and no sign of radiation on 20 metres.

The note has a very slight trace of pulling on 40 metres, but is as clean as a whistle on 20 metres. The keying is clean and sharp, and I have had nothing but flattering reports of the transmission. Input to the final will be about 40 mA at 300 volts giving 12 watts DC in for

perhaps 6 to 8 watts output. If a 12BY7 is substituted in the final, performance should be similar. For 12V DC operation, a DC to DC inverter is the only additional requirement, providing HT. Current drain at 12V would be about 2½ amps on key down, just over ½A with key up. This is surely a good proposition for portable operation, from even a motor cycle battery.

The rig is very rugged and will take all sorts of abuse on tune-up. My transmitter worked "first pop" with no signs of instability. The cheapness and ruggedness of small valves still makes them an attractive proposition for low power transmitters, and the techniques are generally better understood than for RF power transistors. I have been using this transmitter maritime mobile around the Australian coast with excellent results.



Top view of chassis. Oscillator, right; power amp., left.

PARTS LIST

V1-V2 12AT7, 12AX7, 12AU7, etc.
V3 EL822, 12BY7, etc.
S1 3 to 6 position rotary.
S2 DPDT toggle, miniature.
S3 SPST toggle, miniature.
S4 SPDT toggle, miniature.
L1 40m 30 turns on ¼ in. slug tuned former about 1 in. high.
80m 50 turns on ¼ in. slug tuned former about 1½ in. high.
L2 40m 30 turns as for L1.
20m 14 turns on ¼ in. slug tuned former.
L3 On ferrite toroid core 25mm x 4mm (Colour purple, type unknown).
80/40m 15 turns tap at 7 turns.
40/20m 8 turns tap at 4 and 7 turns.
L4 2 turns earth end of L3.
T1 Any 240V AC receiver type with 250-300V each side of centre tap and 6.3 VAC secondary.
X1-X6 Any 40m and 80m amateur band crystals.
Case — Grey hammertone, mild steel, from J. H. McGrath, Melbourne.

NOTE: 80m coil data is approximate only as rig not operated on this band. ■

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RF MONITOR: lets you hear your own transmission. Also useful for adjusting RF processor

IF SHIFT: (Passband tuning) varies IF passband without changing receive frequency-lets you eliminate unwanted signals. RIT lets you vary receive frequency 5k Hz either side of VFO.

VERNIER: Plate tuning control has vernier for fast precise tune-up adjustment.

HEATER: lets you turn off tube filaments on receive only. TS820's solid state circuit draws less than most car dash lights.

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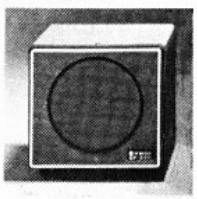

SP-520: 80hm external speaker

VFO820: Remote VFO 5.0 – 5.5 MHz

TV502: 2MTR band transverter

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WECAR1

WIA INFORMATION CORNER

THE WIRELESS INSTITUTE OF AUSTRALIA — SA DIVISION INC.

Postal address: Box 1234, GPO, Adelaide, 5001.

Headquarters: Burley Griffin Building, Thebarton Council Depot, West Thebarton Road, Thebarton, S.A.

Telephone: 352 3428 (Headquarters), 258 7442 (Membership Secretary).

Officers for 1977-78:
- President: Colin Hurst VK5HI.
- Secretary: Clive Pearson VK5PE.
- Treasurer: David Adlam VK5QL.
- Membership Secretary: Rhondda Holker.
- Federal Councillor: Ian Hunt VK5QX.
- WICEN Controller: Gerry Preston VK5PI.
- Programme Organiser and Broadcast Officer: Allan Holker VK5ZRF.
- Education Co-ordinator: John Mitchell VK5ZJB.
- Headquarters Supervisor: Mike Hart VK5ZMH.
- Immediate Past President and Repeater Committee Chairman: Garry Herden VK5ZK.

ACTIVITIES

Monthly Meetings

The General Meeting of the South Australian Division of the WIA is held on the fourth Tuesday of each month at 8.00 p.m. at the Burley Griffin Building, West Thebarton Road, Thebarton (at the rear of the Thebarton Council Depot).

Typical programmes for the monthly meetings include technical lectures, buy and sell nights, equipment displays and social events.

Visitors are welcomed at all Divisional functions.

Divisional Journal

All members and affiliated clubs receive copies of the SA Divisional Journal of news, notes and technical articles. The Journal is published on alternate (even months).

Equipment Supply Committee and Publications Committee

The Equipment Supply Committee and Publications Committee offer surplus equipment, components for projects and technical books, at attractive prices, to WIA members each month on the regular meeting night.

Mail order facilities are available for country and interstate members of the WIA, who should address enquiries to:—

The WIA ESC,
C/- 274 Diagonal Road,
OAKLANDS PARK, 5046.

Wireless Institute Civil Emergency Network

Members of the Institute throughout Australia offer their services to provide communications in times of emergency. Regular training sessions are held and the WICEN organisation, with the approval of the Postal and Telecommunications Department, also assists voluntary organisations at major public functions.

This activity is open to both transmitting and non-transmitting members and provides a valuable community service.

The WICEN Officers in South Australia are Gerry Preston VK5PI (Controller) and Alan Raftery VK5BW, David Brown VK5ZT and Brian Roberts VK5VI (Co-ordinators).

Microprocessor Group

The Microprocessor Group meets on the second Friday in each month at 8 p.m. at the Burley Griffin Building.

The Group, first formed in September 1976, organises technical lectures, construction projects and computer programming courses. Bulk-buying facilities are available to Group members and a newsletter is circulated approximately every two months.

The Group Chairman/Meeting Organiser is Clive Pearson VK5PE, and the Secretary/Treasurer is John Moffat VK5MG.

Youth Radio Club Scheme

The Institute sponsors and supports the Youth Radio Club Scheme, which provides knowledge and practice of radio communication to persons of school age.

For Adelaide residents, the YMCA Electronics Club (YRCS) meets on Fridays at 7 p.m.

Other Youth Radio Groups are active elsewhere in the Adelaide metropolitan area and at centres throughout Australia. For information of the nearest YRCS Club to your address, apply to the WIA, Box 1234, GPO, Adelaide, 5001.

Scout Radio Clubs

Many Scout Groups have their own radio clubs. For those Groups which do not normally provide this facility, members of the WIA assist by participating in the annual Jamboree-on-the-Air and by inviting Scouts to their transmitting stations.

The Scout Liaison Officer in South Australia is Geoff Taylor VK5TY.

Ladies' Amateur Radio Association (LARA)

Licensed lady amateur radio operators and short-wave listeners have formed the Ladies' Amateur Radio Association, which holds regular transmitting schedules on the 80 metre band at 8 p.m. CST on Monday nights.

LARA also supports other amateur radio and social activities through the WIA. New members are welcome. The South Australian representative of LARA is Myrna Marnie VK5YW.

WIA Amateur Satellites (Project Australis)

This is a national amateur radio project for the provision and administration of amateur satellite communications facilities. The Project Committee is actively involved in AMSAT, the Amateur Satellite Corporation, which is an international radio amateur group based in Washington.

AMSAT co-ordinates the planning, construction and launching of the OSCAR (Orbiting Satellite Carrying Amateur Radio series of satellites.

Using OSCAR, radio amateurs are able to engage in long distance VHF radio communications by satellite and to take part in basic research using satellite communications systems.

The SA OSCAR Co-ordinator is Colin Hurst VK5HI.

QSL Card Bureau

The Division provides a service, at a very nominal rate to members, for the receipt and forwarding of QSL cards. These colourful and interesting cards are exchanged all over the world to confirm two-way radio contacts and to provide short-wave listener reports.

Associate Members of the WIA are allocated listener station identification numbers for their use when submitting listener reports to amateur stations. Listeners regularly participate in a number of international radio contests.

The SA QSL Bureau has been operated for almost 40 years by George Luxon VK5RX.

Divisional News Sessions

The transmitting station of the SA Division of the WIA (VK5WI) provides a session of news and notes for members, each Sunday morning at 9.00 a.m. local time.

The session originates on 1.820 MHz and is relayed in the amateur bands on 3.550, 7.125, 14.175 and 28.5 MHz. For VHF listeners, the session is relayed on 53.1 MHz and in the 2 metre band through the Channel 8 repeater at Mt. Lofty and through the Channel 2 repeater near Port Pirie.

Local relays are also provided in Darwin, Alice Springs and Mt. Gambier.

Training Courses

The SA Division of the WIA and the Department of Further Education, with the sponsorship and support of the WIA, run regular courses of instruction to prepare intending applicants for the amateur radio licence examinations.

Several Divisions of the WIA provide nightly slow-morse practice sessions in the 80 metre amateur band on approximately 3.550 MHz.

Membership of the Wireless Institute of Australia

In the case of the SA Division, we solicit a $1 nomination fee with each application and ask that forms should be addressed to the "Membership Secretary". (Please complete the coupon printed elsewhere and mail as directed so that an application form may be forwarded.) ■

RADIO CLUBS IN TASMANIA

SOUTHERN BRANCH OF WIA

Postal Address:
PO Box 123, Sandy Bay, 7005.

Phone Contact:
(002) 43 9192.

Meetings:
On the first Wednesday of each month at 2000 hrs. at the SES Building, Melville St., Hobart.

Secretary:
Richard Rogers VK7RO, Huon Rd., Hobart.

Equipment Store:
Allan Ruthven, Old Beach. Ph. 72 8393.

Instructional Classes:
At both AOCP and Novice levels are held in conjunction with the Adult Education Board. Contact Andrew Boon VK7AW, 7 Flint Ave., New Town, 7008. Ph. 28 5807.
A Ladies' Auxiliary Group, "WAGS", arranges social functions. Contact Dot Noble, 32A King St., Bellerive.

NORTHERN BRANCH OF WIA

Postal Address:
PO Box 1010, Launceston, 7250.

Phone Contact:
(003) 39 1863.

Meetings:
In the club rooms at 34 Bourke St., Launceston, on the second Friday of each month at 2000 hrs.

Secretary:
John McCulloch VK7CCC, Evandale. Ph. 91 8288 (ex. 64).

Equipment Store:
Mike Wilson VK7ZWW, 11 George Town Rd. Ph. 26 3588.

Instructional Classes:
Both AOCP and Novice level are available. Contact Brian Yeoman VK7ZBY, Launceston Airport. Ph. 91 8218.

Club Call Sign:
VK7NB.

Club Publication:
Monthly Newsletter "QRM".

NORTH-WEST BRANCH OF WIA

Postal Address:
27 Hogg St., Wynyard, 7325.

Phone Contact:
(004) 27 8946.

Meetings:
Second Tuesday of each month at Lakins Hall, Ulverstone.

Secretary:
Kirby Cunningham, 27 Hogg St., Wynyard. Ph. Kirby Cunningham VK7ZKC, 27 Hogg St. Wynyard. Ph. 42 2862.

DIVISIONAL INFORMATION

VHF Officer:
Joe Gelston VK7JG.

Repeater Co-ordinator:
Peter Frith VK7PF.

QSL Bureau Postal Address:
GPO Box 371B, Hobart, 7001.
Outwards cards for members cost 2 cents each.

QSL Manager:
Chas Harrison VK7CH, 34 Wentworth St., Bellerive, 7018.

WICEN:
An affiliation exists with the State Emergency Services and WICEN also co-operates with Police Services. State Co-ordinator, Brian Morgan VK7RR.

Educational Services:
Self-instructional materials and assistance to clubs is available. State Co-ordniator, Reg Emmett VK7KK, 111 New World Ave., Launcestn, 7250. Ph. (003) 31 2090.

News Broadcast:
Each Sunday at 0930 hrs. Originates from each branch in rotation. State Co-ordinator, Brian Yeoman VK7ZBY. Ph. (003) 91 8218.

On 3.170 MHz, 7.130 MHz. Repeater 8, Launceston, 2m and 6m Hobart and Devonport.

Intrastate Contest:
Athol Johnson Memorial VHF Contest. Date to be decided each year.

QUEENSLAND DIVISION

DIVISIONAL INFORMATION .....

Enquiries:
Enquiries about ony of the following can be addressed to The Secretary, Box 638 GPO, Brisbane, 4001. Please use a separate sheet of paper for each item of business to facilitate distribution of work to the officers concerned.

Grades of Membership:
Full membership is open to successful examinees of the AOCP, AOLCP, AONCP. Applicants should supply their call sign or licence certificate number. Subscription: City $20; Country $18.

Associate membership is open to all others. Subscriptions as above.
City members are defined asthose who live inside the Brisbane Telephone District, which includes the zones of Redcliffe, Samford, Ipswich, Beenleigh and Cleveland.

Pensions who are, or have been, members of the Institute and whose sole income is from the aged or similar pension or income of similar level may, on a recommendation from Divisional Council, be eligible for a subscription rate approximately 2/3 of the regular subscription.

Family members. Where there are two or more members of the one household who belong to the WIA, only one issue of "Amateur Radio" and "QTC" may be required. One member of the family pays full subscription and receives the magazine in his name, while the other member has his subscription reduced by $7.

General Meetings:
Third Friday of each month, except December, at the YCWA rooms, opposite the Girls' Grammar School, Gregory Terrace, Spring Hill, at 8 p.m. Visitors are welcome. Publications, disposals items, and QSL services are usually available. For club meetings refer list.

News Broadcasts from VK4WIA
Queensland Division news is broadcast each Sunday at 2300Z, 0900 EST, on 14.342 MHz, 7.146 MHz, 2m channels 48 and 42, by Harold Bremmerman VK4HB.
The news is rebroadcast on 3.580 MHz, 21.175 MHz, 28.550 MHz, and 2m by clubs throughout the State.

News items should be posted to Box 638, GPO, Brisbane.

Late items may be phoned to VK4HB on 263 1930 up ta Saturday evening.

QTC:
This bulletin of the Queensland Division is circulated monthly as a supplement to "Amateur Radio", and contains news of local interest, details of meetings, disposal sales, etc.

Disposals:
Useful equipment becomes available from time to time and is advertised for disposal to members, by ballot, in QTC.

Publications:
A number of well known radio books are kept in stock. Call books and log books are also available. Refer QTC.

QSL Cards:
Members may obtain QSL cards for their own use from the Inward QLS Officer, C/o Box 638, GPO, Brisbane, by forwarding 86 cents city or $1.20 country, to defray postage. Cards are supplied by the Queensland Government Tourist Bureau and provided free to members.

Inward QSL Bureau:
C/o Box 638, GPO, Brisbane, 4001. Cards are available at general meetings or will be posted direct to members who have a postal credit with the Bureau.

Outward QSL Bureau:
Fred Lubach VK4RF, 21 Bovelle St., Camp Hill, 4152, will receive cards direct or cards fay be forwarded to Box 638. All cards must carry QSL stickers which are available from the Secretary. Remarks on cards must not exceed five wordh to qualify for reduced postal rates overseas.

Intruder Watch:
Organiser Murray McGregor VK4KX. Reports should give times, frequency, matter broadcast, for identification, location or direction, etc., of the intruder. Reports are appreciated.

Slow Morse:
Transmissions are on 3580 kHz, 9030Z, GMT, Tuesday, Wednesday and Thursday nights.

Class Notes for Amateur Licence Examinations:
Available to members, who may obtain details from The Secretary, Box 638.

Conventions:
A Divisional Convention is held annually in the Moreton district and regular conventions are held in the Rockhampton and Townsville areas. Early details are published in QTC.

Country Net:
A net, on approximately 3610 kHz at 0930Z, is conducted each Wednesday night, usually by someone in touch with Divisional Council, mainly for country members, but all are welcome. Please join in.

Contests:
The Sunshine State - Jack Files Memorial Contest, for VK4 operators, is usually held in July as a warm-up for the Remembrance Day Contest. All bands. Details in QTC.

WICEN:
State Co-ordinator: George McLucas VK4ZBG, C/o Box 638, GPO, Brisbane, 4001.
North Queensland Co-ordinator: Ted Gabriel VK4YG, C/o Box 1426, PO, Cairns, 4870.

Active Groups:
BEN — Brisbane Emergency Net. C/o Box 638.
Cairns ARC.
Townsville ARC.
Mackay ARC.
Gold Coast RC.
Ipswich and District RC.
Redcliffe ARC.

OSCAR Co-ordinator:
Mr. L. Murray VK4LO, C/o Box 638.
A reminder that the Hon. Secretary,
Queensland Division WIA,
Box 638, PO,
Brisbane, 4001,
will be pleased to assist you in any way related to amateur radio.

WESTERN AUSTRALIAN DIVISION

WA VHF Group:
VK6WH, PO Box 189, Applecross, WA, 6153.

Dept. of Electrical Engineers' Radio Club:
VK6XE, WAIT, Hayman Rd., Bentley, WA, 6102.

Aust. Amateur Radio Teleprinter Group:
Box N1002, GPO, Perth, WA, 6001.

WA Repeater Group:
Box N1002, Perth, WA, 6001.

Bunbury Cathedral Grammar School Radio Club:
VK6OT, Box 534, Bunbury, WA, 6230.

Slow Morse Transmissions:
VK6AWI, 3550 kHz approx., 1200 hrs. UT, Monday to Friday inclusive.

QSL Bureau:
Box N1002, GPO, Perth, WA, 6001.
QSL cards inwards and outwards.

WICEN:
Wednesday evenings, 1200 hrs. UT, 3600 kHz ± 5 kHz, plus all national WICEN frequencies.

Operational Repeaters:

Channel 2 — Perth	VK6RAP
Channel 4 — Perth	VK6RAH
Channel 4 — Mount Barker	VK6RAA
Channel 6 — Bunbury	VK6RBY
Channel 8 — Wagin	VK6RAW
Channel 8 — Kalgoorlie	VK6RKG

Monthly Meetings:
Held on Third Tuesday of each month at 1130 hrs. UT. Science House, 710 Murray St., West Perth, WA, 6005.

Council Meetings:
Held at the QTH of the Secretary, 388 Huntris Rd., Woodlands, WA.
Observers welcome.

PRINCIPAL AMATEUR BAND ALLOCATIONS

From "Novice Amateur Radio" publications.
Sam Voron VK2BVS

MEDIUM FREQUENCY (MF) ALLOCATION

1.60 Metres — 1.8 to 1.860 MHz
1.800 to 1.815 MHz morse section.
1.815 to 1.860 MHz voice section.
1825 MHz national call channel.
1820 kHz also a popular crystal net.

160m provides the longest ground wave coverage, about 150 miles. Reliable local day time coverage using mobile equipment. Especially popular in the UK as a local mobile and base operation. Several thousand miles can be covered at night. Under certain lonospheric conditions, especially when solar activity is low, 160 metres is the only amateur allocation which will support communications with interstate areas. Being the highest wavelength available to amateurs, it is also the best band for communications within limestone caves.

AM home-made simple rigs are popular on this band. DX-ing at sunset into the USA and South America, at midnight into Asia and before sunrise into Europe. Morse and LSB voice are best for DX-ing. WIA broadcast on 1825 kHz AM.

HIGH FREQUENCY (HF) ALLOCATION

80 metros — 3.5 to 3.7 MHz
3.525 to 3.575 MHz is the Novice Band in Aust.
3.5 to 3.550 MHz morse section.
3.550 to 3.7 MHz voice section.
3.7 to 3.75 MHz is the US Novice Band.
3.565 MHz is a popular Novice listening and working channel as is 3.555 MHz.

Ground wave distance is about 90 miles on this band, however, at low solar activity periods day time coverage of 200 miles is common due to lonosphere E layer propagation. Night time provides Australia and New Zealand reliable coverage. Some AM stations but mainly LSB and morse operation. DX-ing also popular as is mobile interstate working.

40 metres — 7.0 to 7.15 MHz
7.1 to 7.150 MHz is the American Novice Band.
7.00 to 7.035 MHz morse segment.
7.035 to 7.150 MHz voice segment.
7.050 MHz national listening channel.
Some AM stations but mainly morse and LSB.

Reliable day time skip interstate, when solar activity is high stations within the State can be worked. During evening and night world-wide coverage is possible using SSB and especially morse to get through the interference from broadcast stations.

Some AM stations but mainly morse and LSB.

20 metres — 14.0 to 14.35 MHz
14.0 to 14.1 morse, 14.1 to 14.35 voice.
14.1 to 14.2 popular into Europe.
14.2 to 14.35 popular into the USA.

At high solar activity provides world-wide day and night coverage. Whereas 160 and 80 metres provides a "blanket coverage", on 40 and 20 metres there is usually a skip zone. It is the most popular international DX amateur band using morse and USB.

15 metres — 21.0 to 21.45 MHz
21.125 to 21.2 is the Novice Band in Australia.
21.0 to 21.150 is morse.
21.150 to 21.450 is voice.
21.1 to 21.2 is the US Novice Band.
In the US voice is 21.25 to 21.45 MHz. Morse is 21.0 to 21.25 MHz.

Sometimes this is the only band which can be used to contact stations in the US, especially when only Europe can be contacted on 20 metres or when only Pacific Islands can be reached on 20 metres.

21.210-21.440, 24 ch. Japanese mobile band in 10 kHz spacing.

15 metres is more variable during the low solar activity periods but becomes more reliable at high solar periods. The variability of this band makes

DX-ing quite popular. During mid-summer and winter interstate contacts are possible using sporatic E propagation. Morse and USB are popular. South American AM signals can be heard at times.

10 metres — 28.0 to 29.7 MHz

28.1 to 28.6 MHz is the Australian Novice Band.
28.1 to 28.2 MHz is the US Novice Band.
28.0 to 28.5 is the American morse section.
28.5 to 29.7 is the voice section.
28.5 is the national calling frequency in Australia.
28.55 MHz is a popular international channel.
28.6 MHz is the international DX listening frequency.

A 23 channel systems is being organised for modifying 11 metre rigs on to 10 metres. The range will be from 28.3 to 28.590 MHz using the same channel spacing as on 11 metres.
28.3 to 28.5 will be for AM and SSB.
28.5 to 28.590 for SSB.
28.5 to 28.65 MHz is the international DX-ing segment for voice.
28.0 to 28.1 MHz is the international DX-ing segment for morse.

During high level of solar activity 10 metres supports world-wide low power communications. Each summer and winter, Pacific wide excellent sporatic E communications is possible independent of the solar activity.

28.7 to 29.4 many AM nets operate in the USA.

29.45 to 29.55 is the amateur satellie band — satellites can be heard three times daily for 20 minutes as they orbit overhead. They relay amateurs from thousands of miles away.

29.6 MHz is the American FM national calling frequency.

29.5 to 29.7 MHz, sixteen American repeaters for FM mobile use.

Morse, AM, USB are all popular. A popular local base and mobile band.

28.2 to 28.25 is the international amateur 10m beacon band. These beacons transmit 24 hours daily providing an indication of propagation conditions for the 10 metre DX enthusiast.

OA4VHF — Peru	28.185	MHz
9J2BBB — Zambia	28.2025	MHz
DL0IGI — West Germany	28.205	MHz
W4 — USA	28.2075	MHz
3B8MS — Mauritius	28.210	MHz
ZD9GI — Gough Isl.	28.2125	MHz
VK2WI — NSW, Australia	28.2175	MHz
5B4CY — Cyprus	28.220	MHz
YU — Yugoslavia	28.2225	MHz
F3THF — France	28.2275	MHz
VE3TEN — Canada	28.225	MHz
ZL3MHz — New eZaland	28.230	MHz
VP9BA — Bermuda	28.235	MHz
PY1CK — Brazil	28.24	MHz
A9XC — Bahrain	28.245	MHz
WA1IOB — USA	28.250	MHz

Some of the above beacons such as Sydney are planned, others are changing to the above new frequencies.

VHF (VERY HIGH FREQUENCY) ALLOCATION

6 metres — 52 to 54 MHz

(1) **List of 50-54 MHz Beacons:**

VK0MA — MAWSON	53.100
VK2WI — SYDNEY	52.450
VK4RTL — TOWNSVILLE	52.600
VK5VF — MT. LOFTY	53.000
VK6RTV — PERTH	52.300
VK6RTU — KALGOORLIE	52.350
VK6RTW — ALBANY	52.950
VK7RNT — LAUNCESTON	52.400
VK8VF — DARWIN	52.200
JD1YAA — JAPAN	50.110
KH6EQUI — HAWAII	50.104
ZL2VHP — PALMERSTON NTH.	52.500

(2) **6 Metre Band Plan:**

MHz	
52.000-52.010	"Earth - Moon - Earth" (moon-bounce) operation only, any mode.
52.010-52.100	DX operation only; subdivided according to mode as follows:
52.010-52.050	CW operation only.
52.050-52.100	Narrow modes only (e.g. CW, SSB, DSB, AM, FSK).
52.100-52.300	All narrow band modes, DX and local tunable operation.
52.300-52.400	Beacons only; secondary beacon segment.
52.400-52.500	Beacons only; primary beacon segment.
52.500-53.100	Simplex net operation, primarily FM.
53.100-54.000	General operation; DX, local, and experimental operation, and modes; "private" nets; future linear translators and repeaters.

Calling frequencies are as follows:

52.025	CW
52.050	Meteor Scatter — any narrow band mode.
52.075	RTTY (FSK).
52.100	Primary SSB/AM calling frequency.
52.200	Secondary SSB/AM calling frequency.
52.300	SSTV(F4) slow such television.
52.525	FM national call channel.
52.656	FM secondary channel.

Low power long distance sporatic E propagation in mid summer and winter. Covering a range of 400 to 2500 miles with extremely strong signals. An excellent mobile band giving a reliable range of 75 to 100 miles. DX-ing can also take place as a result of Tropospheric weather conditions causing signals to be propagated between different air layers.

FM, USB and morse popular. USB and 52.525 MHz FM.

2 metres — 144 to 148 MHz (VHF)

(1) **List of 144 to 148 MHz Beacons:**

VK1RTA — CANBERRA	144.475
VK2WL — SYDNEY	144.010
VK2RHR — MITTAGONG	144.120
VK3RTG — VERMONT	144.700
VK4RTT — MT. MOWBULLAN	144.400
VK5VF — MT. LOFTY	144.800
VK6RTW — ALBANY	144.500
VK6RTV — PERTH	145.000
VK7RTX — LONAH	144.900
ZL1VHF — AUCKLAND	145.100
ZL2VHF — WELLINGTON	145.200
ZL2VHP — PALMERSTON NTH.	145.250
ZL3VHF — CHRISTCHURCH	145.300
ZL4VHF — DUNEDIN	145.400

(2) **2 Metre Band Plan:**

MHz	
144.000-144.010	EME operation only, any mode.
144.010-144.100	DX operation only; subdivided according to mode as follows:
144.010-144.050	CW operation only.
144.050-144.100	Narrow band modes only (e.g. CW, SSB, DSB, AM, FSK).
144.100-144.400	All narrow band modes, DX and local tunable operation.
144.400-144.500	Beacons only; primary beacon segment.
144.500-144.600	Beacons only; secondary beacon segment.
144.600-145.700	General operation; DX, local, and expirmental operation, all modes; "private" nets; future linear translators and repeaters.
145.7 -146.0	Satellite and space communication.
146.0 -148.0	FM net operation; simplex and and repeater.

Calling frequencies are as follows:

144.025	CW calling frequency.
144.050	Meteor scatter calling frequency, any narrow band mode.
144 075	RTTY (FSK calling frequency.
144 100	Primary SSB/AM calling frequency.
144.200	Secondary SSB/AM calling frequency.
144.300	SSTV calling frequency (F4).
146 & 146.5	Popular FM listening channels (146.5 national FM calling channel).

Tropospheric long distance propagation of up to 500 or even 2,000 kilometres is more marked on 2 metres than on 6 metres, but sporatic E long distance propagation is less evident on 2 metres than on 6 metres. 2 metres is a very popular short range mobile band especially on FM.

ULTRA HIGH FREQUENCY ALLOCATION (UHF)

70 centimetre band — 420 to 450 MHz

(1) **List of 24 hr. 420-450 MHz Beacons:**

VK4RBB — BRISBANE	432.400
VK7RTW — LONDON	432.475
ZL2VHP — PALMERSTON	431.850

(2) **70 Centimetre Band Plan:**
The full 70cm band plan as amended is as follows:

MHz	
420 -432	Amateur Television (ATV) Primary Channel DSB or VSB (ATV-1) Video at 426.25 MHz Sound at 431.75 MHz.
432 -432.0	EME only — any mode.
432.01-432.05	DX only — CW portion (with CW calling frequency at 432.025 MHz).
432.05	Meteor scatter calling frequency.
432.05-432.1	DX only — all narrow band modes (including CW) (with RTTY calling frequency at 432.075 MHz and SSB/AM primary calling frequency at 432.1 MHz).
432.1 -432.4	Tunable operations both DX and local, all modes (with SSB/AM secondary calling frequency at 432.2 MHz and SSTV calling frequency at 432.3 MHz).
432.4 -432.6	Beacons only.
432.6 -433	Tunable operation — any mode. NOTE: Calling frequencies should be used solely for monitoring, calling or establishing contacts. Calling frequencies should not be used for net operations.
433 -435	FM Repeater Inputs.
435 -438	Internationally reserved satellite allocation.
438 -440	FM Repeater Outputs.
440 -441	FM Simplex.
441 -443	Experimental.
443 -450	ATV secondary channel. VSB only (ATV-2). Video at 444.25 MHz. Sound at 449.75 MHz.

Over a 1,000 miles has been covered on tropospheric propagation. UHF has been found to provide coverage into areas VHF signals cannot reach. 70cm is becoming a popular mobile short range band especially on FM.

23 centimetres — 1215 to 1300 MHz mobile antennas on this band are only an inch or two. 23cm signals have been found to reach into areas not accessible to 2m or 70cm coverage. DX via tropospheric propagation has covered as far as 1,500 miles with this distance being pushed further as more operators make up equipment for this band.

Other bands in the super high frequency and microwave amateur allocations are found to propagate over long distance as a result of surface weather conditions (e.g. over 200 miles on 10,000 MHz using only a few milliwatts of power). Much home made equipment is used on these bands.

CHF (576-585 MHz) and 2300 to 2450 MHz.
SHF 3300 to 3500 MHz, 5650 to 5850 MHz, 10,000 to 10,500 MHz and 21,000 to 22,000 MHz. ■

IARU NEWS

At its October meeting the Executive voted in favour of the admission of ORARI to IARU membership. ORARI is the Indonesian Amateur Radio Society.

The Federal President together with Mr. Michael Owen VK3KI, a Director of the IARU R3 organisation will be visiting New Zealand towards the end of November for discussions with NZART officers on the subject of WARC 79. A copy of the NZART WARC 79 submissions to their Administration has been received. ■

INTRUDER WATCH

Alf Chandler, VK3LC

The objectives of Intruder Watch are to observe, identify and report on unauthorised signals appearing or remaining on the amateur bands causing harmful interference to radio amateur operations. We need help in this respect from as many observers as possible because intruders come in all shapes and sizes.

The Federal Intruder Watch Co-ordinator is Alf Chandler VK3LC. At the moment Ivor Stafford VK3XB is standing in for him. Alf Chandler is also the IARU Region 3 Co-ordinator and is in close contact with IARUMS and world-wide Intruder Watch activities.

The 40m band is rendered almost useless at night by broadcasters — amateurs must keep on reporting these intruders otherwise they can claim their signals are not causing harmful interference to the lawful users of the band. Our 20m band has been plagued world-wide by Russian pulse transmissions apparently emanating from over-the-horizon radar tests — numerous and repeated Government-to-Government protests have been made on this. The Russians say this was a test series and steps were being taken to reduce the interference caused to many services in that part of the spectrum; estimates have put the power output as high as 40 MW.

Intruders appear on all bands. Some may be pirates, some may be military stations, some may be various fixed or mobile stations working FSK and other modes. An Intruder Watch column in "Amateur Radio" reports a few details from time to time.

Amateurs must protect their frequency bands and should regard it their only duty to report intruders to their State Intruder Watch Co-ordinator regularly in as much detail as possible — date and time, accurate frequency, mode, identification details and so on. If you do not know your local Co-ordinator write direct to VK3LC. In your observation be careful to eliminate deficiencies (etc.) in your own receiver causing signals to be logged erroneously.

What happens in the system is this. Your reports are checked and compared with others to ensure reliability. The necessary details are processed on to special ITU forms (see AR May 1976, p. 28) for reporting to the Postal and Telecommunications Department. These should, after verification, then go forward as complaints to the Administration of the country concerned. Usually this occurs only when enough reports/complaints are received and when their own monitoring stations confirm the interference.

The message is clear. More Intruder Watch observers (they need not necessarily be transmitting members) are always needed. ■

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

December	
3/4	Spanish Phone Contest
10/11	Spanish CW Contest
10/11	ARRL 10 Metre Contest
10/11	Hungarian CW Contest
10/Jan. 8	ROSS HULL VHF/UHF MEMORIAL CONTEST
January	
7/8	YU 80 Metre Contest
14/15	DL QRP CW Contest
27/29	CQ WW 160 DX Contest
February	
11/12	JOHN MOYLE MEMORIAL NATIONAL FIELD DAY

I would like to mention a few things about contests that are taken for granted by people who are used to entering them. Contests are held for a variety of reasons, such as memorials, commemorating special events, anniversaries, and just to create activity. They can be enjoyed by young and old alike, and are good for fostering international goodwill.

Australian contests include the National Field Day, which is a good opportunity to combine a club outing with a contest. Other contests are the Remembrance Day contest, which for many is the event of the year, and the Ross Hull VHF/UHF Memorial, specially for the VHF enthusiasts.

It is not essential to have high power rigs and big beams to be successful, although sometimes it helps. Operating skill will overcome many equipment deficiencies. I have heard a number of people who are under the impression that if they give a number in a contest, they will be obliged to submit a log. This is not true, although the organisers of the various contests do appreciate as many logs as possible.

There are contests on just about every weekend, although many are confined to a particular area and not of great interest to VK. Those that are likely to be of interest to VK, I attempt to include in the contest calendar, and for some, the rules as well. It is not possible to include complete rules of every contest, as space and time does not permit.

Also, when notified, VHF field days and other more local activity can appear in the list. One contest which has not been mentioned so far is the VK/ZL/Oceania, which is organised alternatively by VK and ZL. This is an international contest with world-wide participation, unlike the other Australian contests.

Well, that's about all for this month — I had better get back to checking logs for the RD contest. About 900 hundred logs were received this year. Results will be presented as soon as possible.

VK5 VHF GROUP FIELD DAY CONTEST

Time: 0600Z 3/12/77 to 0700Z 4/12/77.

Details: VK5 looking for all VK. The contest is open to portable, mobile and fixed stations. Fixed stations may contact only portable or mobile Stations for scoring purpose.

Bands: 6 metres and above, plus OSCAR (both modes).

Scoring: The scoring system is a litle complicated and owing to printing deadlines, the exact details were unobtainable. However, all logs will be scored by the VK5 VHF group and the results published in AR in due course.

Contact with the same sttaion each two hours is permitted.

Logs: Entrants to forward logs to VHF Group, PO Box 1234, GPO, Adelaide, 5001. Closing date for receipt of logs is 6th January, 1977.

The usual RS(T) plus serial and commencing from 001 to 999 must be included for each contact, together with location of station worked to validate contacts. ■

AWARDS COLUMN

Brian Austin, VK5CA
P.O. Box 7A, Crafers SA, 5152

The Wireless Institute of Australia issues a number of awards to operators of amateur stations and short-wave listeners. They are available at no cost to members of the WIA. A small charge to cover handling and processing is made to non-members. Sufficient postage to cover the cost of returning QSL cards and/or certificate (and registration if required) should be enclosed with your application.

The most popular of these is the DX Century Club (DXCC), for which several hundred amateurs have qualified. It is open to any VK amateur station or a station operating in a previously Australian administered territory. A copy of the rules of the Club and of the Australian DXCC countries list appears in the 1977 Call Book, or will be sent on application to me at the above address on receipt of an s.a.s.e.

The Worked All VK Call Areas Award is open to licensed amateurs operating anywhere in the world except Australia. VK amateurs are not eligible for the award. To date 696 certificates have been issued.

VHF operators are catered for by the VHF Century Club, Worked All States (VHF) and Worked All VK Call Areas (VHF) Award. Copies of the rules of these awards will be forwarded on request (s.a.s.e. please).

You might like to have a go at the following between festivities:

SCORPION GROUP AWARD

1. All contacts after 1/7/71 count.
2. SWLs are eligible for the award. The requirements are similar.
3. Stations in Oceania, Asia and Africa require contacts with two of the following stations — any band, any mode. Valid stations: HI8CAB, CDS, CRO. EDS, EJH, EVA, FED, HAM, LC, LPC, SRH, MOG; HI8LPN silent key 1974.

Send QSLs, copy of log and 10 IRC to DX Scorpion Group, PO Box 1722, Santo Domingo, Dominican Republic.

The Awards Manager and his staff (XYL Marlene) extend their best wishes for a Merry Christmas and fruitful (DX-wise) New Year to everyone.

WEST AUSTRALIAN DIVISION CONTESTS AND AWARDS

Over the last four or five months after numerous requests there has been a series of annual transmitting contests organised for the West Australian members, with a certificate for the winners and a plaque which will be held for a period of one year.

The contests are held on 3.5 MHz CW and SSB also on the VHF bands 52 MHz and up all modes these being held over a week-end and being of 3 hours' duration on a Saturday and Sunday evening from 1100 GMT to 1400 GMT, i.e. 6 hours in all. Reports need to include a code for the shire in which the station resides and the last two numbers of the corresponding postcode.

On the basis of this two awards will be available which will be known as:

(a) Worked all West Australian shires Award.
(b) Worked all West Australian Postcodes Award.

To become eligible for these it is necessary to work for (a) 80 shires and (b) 150 postcodes respectively with proof of the QSOs, to be forwarded to the contest committee c/o Post Box N1002, Perth, 6001. These awards are open to all amateurs on a world-wide basis, all bands 3.5/28 MHz, as from the 30th June, 1977.

Copies of the shires map are available from the contest committee at a cost of $1.50 Australian, post paid.

ZONE 29 AWARD

The Zone 29 Award is issued by the West Australian Division of the Wireless Institute of Australia to licensed amateurs and SWLs throughout the world. To qualify for this award, the following conditions must be satisfied:

1. Establishment of two-way communication with any twenty-five different amateur stations situated in Zone 29. Communication to be made after 0001 WAST January, 1952.
2. The total of 25 different stations may be obtained by operation on one or more of the amateur bands.
3. Any types of emission which are permitted by the local licensing authority may be used.

The Certificate will be endorsed when issued as confirmation of fulfilment of the following special conditions:

(a) All 25 stations obtained from operation on one band only. (OPEN.)
(b) All 25 stations obtained from operation of phone transmission. (SSB, AM, FM, etc.)
(c) All 25 stations obtained from operation of CW transmission.
(d) All 25 stations obtained by one band operation and phone only.
(e) All 25 stations obtained by one band operation and CW only.
(f) 25 stations heard by SW listener, in (a)-(e) of above.

Confirmation in writing of all contacts must be submitted to:

The Secretary,
WIA (WA Division),
Box N1002, GPO,
Perth, WA 6001

together with $1(A) or 5 IRC. ■

ATV NEWS

KEVIN CALLAGHAN VK3ZVJ
PETER COSSINS VK3BFG

In the early 1950s there was a little interest with completely home made gear as in those days there was no television at all in Australia. Some demonstrations were conducted by some VK3s at some exhibitions. I am not aware of the call signs involved and I would appreciate finding out, and from what we have been able to find, most of the ATV history has been lost. These demonstrations caused a fair amount of interest with the general public.

It is of interest to note that to build a picture monitor involved importing a picture tube from overseas, this caused some political problems and the import request was refused. One of the local Melbourne newspapers came to the rescue with some adverse publicity and the import was eventually allowed.

The next known activity was in VK6 and a series of articles appeared in AR in 1957 or 1958 about building your own camera and equipment. There was some more activity in VK3 with the advent of these publications.

The next people to come on to the scene were the VK5s, VK5ZEY transmitted pictures in the now extinct 288 MHz band. Films of his transmissions are still in existence. The VK5s were very active with their publicity and did many Outside Broadcasts, including sporting events with relays to the Royal Shows. This was conducted for many years with very good results. Home made video gear with some ex commercial TV gear performed the functions. A colour telecine was built and so were colour monitors, and colour films were transmitted closed circuit well before colour was ever introduced commercially into Australia. In VK3 there were a number of cycles of activity over the next few years ending up with the current cycle. At present there are about 70 to 80 receiving stations, and of these about 25 capable or have transmitted pictures. All VK3 activity is on 426.25 MHz with an occasional transmission on 444.25 MHz. Only one station is transmitting on the 576 MHz band and there are also video transmissions on the 1296 MHz band.

VK1 has had an occasional transmission and at this stage one station is known to be capable of putting out pictures.

VK2 has pockets of activity in Sydney, Gosford and Lismore.

VK3, besides Melbourne, has activity in Ballarat, Bendigo, Geelong and Northern Victoria. One or two stations are also active in Gippsland.

VK4 has activity in Brisbane and one or two stations further north.

VK5 has a very active group in Adelaide and also Mt. Gambier. The Adelaide group are using the secondary video channel as their primary and the primary channel as their repeater input. The Adelaide repeater is now in operation and under test.

VK6 has activity in Perth and soon to be in Albany.

VK7 has activity in Hobart with a couple of stations and Northern Tasmania with a few more.

There are a number of avenues to pursue with ATV. Some stations concentrate on the video production side. This involves perfecting their camera operations also their lighting, radio, recording and video efforts. Colour also can come into this section. Other stations concentrate on improving their transmission with various antennae and various transmitters.

Another avenue is using digital equipment and seeing what video and effects can be constructed.

Other stations are quite happy to use the video medium as a TV telephone and use either a simplex transmission or work crossband.

A much larger number of stations, including SWLs, are quite happy to watch the happenings, and in some cases the characters who appear on camera are more interesting to watch than normal commercial transmissions.

Well, I hope that this gives the newcomers an insight of amateur television. ■

MAGAZINE INDEX

Syd Clark, VK3ASC

BREAK-IN August 1977
Ramblings on "Q" of tuned circuits; Aerials for Portable VHF Equipment; A Simple Variable DC Power Supply; A Small Club's Answer to AREC Communications; The Home-brewer; World Problems in Radio Communication.

CQ July 1977
Touch Control for the Curtis Chip Keyers; CQ World-Wide WPX/SSB Contest All-Time Records; Basic Radio; The WB2DCX Plumbicon SSTV Camera, Part 2; Coherent CW — The CW of the Future, Part 2; How Rare is that Country; New Life for Old Meters; Reply to a YL: FB OM, UR SOLID COPY; Practical uses for SSTV; Multiband Antennas and an Unusual 40m Beam; Optical Fibres; Amateur Radio Signal Reports.

CQ August 1977
Who's got the 20½ Million Dollars?; 1976 CQ World-Wide DX Contest Phone Results; It's not Just Hot Air; Basic Radio, Static Electricity; Super Modified HW-8 Contest Machine, Part 1; An RTTY Primer; Low Pass and High Pass Filters; Antennas: 160m; The Ham's Environment: Aesthetics, Interference, or Whatever; Novice Third Party Traffiic; Herbert S. Brier: 1914-1977

HAM RADIO June 1977
432 MHz Kilowatt Power Amplifier; High Performance Spectrum Analyser; RTTY Tape Editor; Top Coupled Bandpass Filters; Gate-Dip Meter; Toroid Permeability Meter; How Many Signals Does Your Receiver See?; 7 MHz Short Vertical; 1270 MHz ATV Power Amplifier; Micro-processors; The Register Pair Instructions.

HAM RADIO July 1977
1296 MHz Transverter; CW Transceiver for 80 and 40 Metres; SSB Spectrum Analyser; Balanced Mixer for 1296 MHz; Self Supporting Coils; Integrated Circuit for Audio Processing; High Dynamic Range Two-Metre Converters; SSTV Captioning Device; Continuity Bleeper; Simple Antenna Instrumentation; Sync Generator for ATV; Microprocessors: Logical Instructions.

RADIO COMMUNICATION September 1977
A Channel Scanning Arrangement for Quartz Crystals; Simple Circuits for the Beginner; Some Experiments with High-Frequency Ladder Crystal Filters.

RADIO ZS June 1977
Tuned Circuits for Multi-band Antennas.

RADIO ZS July 1977
Roll Your Own Insulators In Epoxy; Protection of Radio Equipment Against Lightning; Department of Posts and Telecommunications Exam. Paper for Blind Candidate; Transmitting Valves — How to Use and Abuse Them; Phase Three Satellites.

SHORTWAVE July 1977
A Versatile Cabinet System for Home-Built Equipment; FM — Some Basic Principles, Part 1; Aspects of Radio Coommunications Receivers, Part 3; Measurement of the Gate-Source Cut-Off Voltage of a Junction FET; Improving the Eddystone 888A Receiver; Aerial Tuning System for the SWL.

SHORTWAVE August 1977
A Plain Man's Guide to Use of the 4CX250 Series at VHF and UHF; Triode 3 — Input and Gate for Transmitter Power Supply Sequential Switching; An Interesting New Construction Aid; Another Mast Idea; Some Basic Principles, Part 2; Afloat on 28 MHz and Other Matters.

73 July 1977
Motorcycle Mobile; Inside the Bird; Introducing Autotrack; A Battery Voltage Monitor; The Morse Clock; Hunting Noise; CMOS Oscillators; A Dial for the FM-DX; Robot Scan Converter Details; Bounceless TT Decoder; Hams Profit from CB; Patch Up Your 101; The History of Ham Radio, Part 4; Dipole Designer Program; Software Control; QSL Tips; CB to 10; World's Smallest Continuity Tester; Open New Frontiers; Digital Synthesiser; Selecting a Frequency Counter; Build a Multiplying Prescaler; Phone Patch Tips; Impedance Matching; Digital Clock Fail-Safe; Interest in the Mail Order. ■

WICEN

The abbreviation for Wireless Institute Civil Emergency Network in which radio amateurs are encouraged to enrol so that they will be prepared to assist in natural disasters occurring in their vicinity — bushfires, cyclones, floods, etc. Membership in WICEN, which costs nothing, also assists in training for less extensive emergencies, accidents and the like which amateurs may experience in daily affairs.

Practice WICEN exercises are held from time to time. These include Victorian WIA members providing communication links for the Murray River canoe marathon every New Year. Basically WICEN is not activated until brought in by the police or emergency services. The procedures are simple and quite easy to understand.

If you are interested in forming part of a very worthwhile organisation join the Institute and enrol with your local WICEN State Co-ordinator. These are (check the Call Book for addresses) — VK1RH, VK2NL, VK3AED, VK4YG, VK4MG, VK5BW, VK6DD, VK7RR, VK8DA. The Federal WICEN Co-ordinator is Rex Roseblade VK1QJ. ■

AMSAT-OSCAR 7 ORBITAL DATA CALENDAR
In co-operation with AMSAT, Skip Reymann W6PAJ has published an improved AMSAT-OSCAR orbital data calendar containing all orbits for 1978 for AMSAT-OSCAR 7. Designed so that it may be hung on the wall, the calendar includes information on the operating schedules and frequencies for the spacecraft, and also the telemetry decoding equations. Also included is step-by-step information on how to determine times of passage of the satellite.

The orbital calendar is available post-paid for $5 US funds or 30 IRCs ($3 to AMSAT members, and free to AMSAT Life Members). Overseas orders will be airmailed. Orders and payments should be made in US currency to:

Skip Reymann W6PAJ,
PO Box 374,
San Dimas, California 91773, USA.

Orders may also be charged to VISA or Master Charge.

Important — To speed up handling of your order, please include a gummed, self-addressed label.

Proceeds from the Orbital Calendar benefit AMSAT. ■

QSP

RADIO AMATEUR OLD-TIMERS' CLUB
As a follow on from the QSP in October AR (p. 28), the annual dinner of the RAOTC will be held at the Science Club, Melbourne, on 9th March, 1978. Members and aspiring members (amateurs holding a licence 25 years or more) should write to the address given for reservations.

THE OLDEST AMATEUR
A letter received from the grand-daughter in Western Australia of an amateur living in Auckland says he is 92 and the oldest radio amateur in New Zealand. Is there any amateur in Australia over 90 still holding an amateur licence?

1977 CALL BOOK OMISSIONS
As explained in the Call Book editorial, it was shown there would be errors and omissions but time did not permit these to be resolved before printing began.

Here are some which you can note in your Call Books —

VK2FP — Initials B. J. not B. S. Postal address: Box 103, Bexley, NSW 2207.
VK2GS — Stewart, N. J., 131 Bradfield Rd., Lindfield, NSW 2070.
VK2NW — Was VK2BNW.
VK2BNW — McTaggart, F. K., Dr., 21 Ellsmore Ave., Killara, NSW 2071.
VK2NFB — Healey, C. O., 121 Jamison Rd., Penrith, NSW 2750.
VK5MO — McGrath, E. P., 81 Cave Ave., Bridgewater, SA 5155.
VK5XI — Hannaford, B., 57 Haydown Rd., Elizabeth Gve., SA 5112.
VK5NLF — Listed erroneously as VK5NLS.
VK7ZKC — Was VK4ZGR, now deleted. ■

Sideband Electronics Sales

Distributors of COMMUNICATIONS TRANSCEIVERS

HF TRANSCEIVERS

ASTRO - 200 digital solid state 200 W.P.E.P. **$1000**

TRIO KENWOOD new model TS-520-S 160 to 10 M, with optional digital readout connected externally. Can be used as a frequency counter self contained separately powered by 12 volt DC. **$700**

TRIO KENWOOD model TS-820S AC only 160 to 10 M with digital readout. **$1,100**

TRIO KENWOOD model TS-820 AC only 160 to 10 M. **$930**

TRIO KENWOOD model MC-50 Microphone. **$ 50**

TRIO KENWOOD model TS-600-A FM-AM. SSB transceiver full 50-54 MHz coverage 10 Watt output variable from 1 Watt to full power. VFO controlled AC-DC operation. Styling as TS-700-A. **$700**

TRIO KENWOOD model TR-7400 2 meter FM tranceiver 10 to 25 watts output. Frequency range 144.00 to 147.995 MHz No. of channels 800, Double conversion super-heterodine sensitivity better than 0.4 UV for 20 DB. **$440**

ICOM

VHF TRANSCEIVERS SSB

ICOM model IC-202 2 M SSB portable transceiver 144-144.4 MHz **$215**

ICOM model IC-502 6 M SSB portable transceivers 52-53 MHz. **$215**

ICOM IC-22-S synthesized 22 channel 2 M transceiver 10 channel pre programmed. Supplied with 50 extra diodes for the programming. **$269**

ICOM model IC-245 **$450**

ICOM model IC-211 **$750**

YAESU MUSEN model FT-101-E AC-DC transceivers 10 to 160 M with speech processor **$850**

YAESU MUSEN model FT-301. **$960**

YAESU MUSEN model FT 301 - D **$1140**

YAESU MUSEN model FT - 301 - S **$660**

YAESU MUSEN model FL-2100-BLineal Ampl. **$525**

YAESU MUSEN model FP - 301 **$165**

YAESU MUSEN FR G-7 Uses Wadley loop princ. **$300**

YAESU MUSEN FT221-R 2 meter all mode transceiver. **$628**

FREQUENCY COUNTERS

YAESU MUSEN model YC-500-E-S-J **P.O.A.**

SWR METER

Twin meter model: Y.M. - I.E. 3.5 to 145 MHz prof quality **$ 28**

DRAKE TV - 3300 TV I lowpass filter **$ 34**

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AUSTRALIA'S SOLE DIST. OF KLM PRODUCTS

KLM SOLID STATE POWER AMPLIFIERS

(MHz) 144-148	PA10– 80BL	80	OUTPUT (watts)
"	PA10–140BL	140	"
"	PA10–160BL	160	"
"	PA 2– 70BL	70	"
400-470	PA10– 70CL	70	"
	PA 2– 12-B	12	Watts
	PA 2– 25BL	25	Watts P.O.A.

NOW AVAILABLE

New range of beam antennas from Western Communications U.K. model DX33 3 element tri-bender **$238**

HIDAKA model VS-33 3 element tri-bender including Balun **$258**

VERTICALS:–

HIDAKA model VS-41 80 through 10m. Vertical antenna incl. **$115**
Guide wires (Radial Kit additional $30)

MARK MOBILE ANTENNAS

HW-80, 6' long for 80 M. **$ 28**

HW-40, 6' long for 40 M. **$ 25**

HW-20, 6' long for 20 M. **$ 23**

Swivel mounts & chrome-plated springs for all **$ 13**

CUSH CRAFT ANTENNAS

A144-11 11 Element 2M-Yagi **$ 50**

A147-11 11 Element 2 M Yagi **$ 50**

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ANTENNA ROTATORS

Model CDR Ham-11 for all hf beams except 40 M **$240**

Model CDR AR-22 L junior rotator for small beams **$ 75**

KEN model KR-400 for all medium size hf beams with internal disc brake **$120**

All models rotators come complete with 230-volt AC indicator-control units.

6-conductor cable for KR-400-500 **65 cents per metre**

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Male to male joiner **$1.20**

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CRYSTAL FILTER, 9 MHz, similar to FT-200 ones. With carrier crystals. **$ 35**

APOLLO 3 position co-ax switches **$ 15**

All prices quoted are net SYDNEY, N.S.W., on cash-with-order basis, sales tax included in all cases, but subject to changes without prior notice. ALL-RISK INSURANCE from now on free with all orders over $100; small orders add 50c for insurance. Allow for freight, postage or carriage; excess remitted will be refunded.

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VHF-UHF
AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston. 5233

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
	VK2RHR, Mittagong	144.120
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTT, Mt. Mowbullan	144 400
	VK4RBB, Brisbane	432.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Lonah	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
JA	JA2IGY, Japan *	52 500
KG6	KG6JDX, Guam †	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North ‡	52.250
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North ‡	145.250
	ZL2VHP, Palmerston North ‡	433 250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

* Geoff VK3AMK, advises receiving information via JA2DDN that this beacon will be back on this frequency running 10 watts to a ground plane. Graham VK8ZCJ confirms this by advising he has copied this beacon which sends VVV de JA2IGY continuously. Reports are requested and should be sent to the JARL.

† Graham VK8ZCJ also reports the KG6 beacons are not beacons in the normal sense. They are electronic keyers driving normal amateur stations on an attended basis and do not operate on any specific frequency. KG6JDX for instance was heard on 11-10 running his ident on 52.045 trying to rustle up some other activity. Nearly all the operators in Guam have this facility and use it. None are on for a 24 hour basis though. Thanks Graham for that information. It may still be useful to continue to list the call sign but with a warning that any frequency could be used either on the low end of 50 or 52 MHz.

‡ Selwyn ZL2BJO sends some corrections to the beacons listed in the ZL2 area. The three stations so marked are now listed in accordance with his directions. Note particularly the frequency change of the six metre beacon to 52.250. Thanks for writing Selwyn.

SIX METRES

Graham VK8ZCJ from Darwin has sent me a very interesting letter, most of which I have decided to publish because there are items in it which will make the mouth water of those living in southern climes, and there is also some food for thought towards the end. I quote:

"Firstly I would like to say we VHF operators in Darwin are very lucky to be here. I am convinced Darwin is probably the most interesting spot for six metre operation in Australia. It's not so much the equipment used or operator skills, just the location.

"Secondly, BE WARNED. This year will probably be the best for JA contacts for many years, probably the best since 1972. All operators could reasonably expect to have some good openings. To back that up, here are some facts.

"Since my last letter JAs have been worked as follows:

21-9	1020-1045Z	JA1, 2, 3 and 4 — 7 stations.
23-9	1210-1319Z	JA1 and 2 — 7 stations.
24-9	1255-1320Z	JA2, 3, 4 and 5 — 4 stations.
26-9	1040-1255Z	JA1, 2, 3, 4 and 6 — 11 stations.
30-9	1055-1215Z	JA5 and 6 — 4 stations.
1-10	1035-1330Z	JA1, 2, 3, 4 and 5 — 38 stations.
4-10	1155-1307Z	JA1, 2, 3 and 4 — 14 stations.
5-10	1215-1230Z	JA2 — 2 stations.
6-10	1134-1214Z	JA2 and 6 — 4 stations.
7-10	1112-1314Z	JA2, 3, 4, 5 and 6 — 15 stations.
8-10	1122-1230Z	JA1, 3, 4, 5 and 6 — 12 stations.
9-10	1200-1345Z	JA2 and 4 — 3 stations.
11-10	0958-1155Z	JA2, 3 and 4 — 9 stations.

"As you can see this is a phenomenal list and I might add on 9-10 and 11-10 many other JAs were available but I was otherwise occupied as you will shortly find out. One thing which has been quite staggering is the reliability of propagation over the last week (to 11-10) just about every night there are JAs to work.

"I had occasion to phone Ross VK4RO on 10-10 and he advised openings had not got down that far yet, and he had not heard or worked any JAs this season.

"George P29HV . . . I have heard JAs working George in Port Moresby, but no sign of George in Darwin. I have lost some of my notes but George P29HV was worked by one of the biggest dogpiles you could imagine on both 6-10 and 7-10 around the same times as the openings to Darwin.

"Now for some interesting information. KG6 Guam has been worked in Darwin on 9-10 and 11-10. Times were 1200 to 1315Z and 0957 to 1055Z respectively. Both Brian VK8VV and myself were operating on 9-10 but Brian had a cockatoo or similar feathered 'fiend' chew up his 300 ohm feedline and was QRT on 11-10. KG6JIH and KG6JDX were on on 10-11 and 11-11 KG6JIH, KG6JDX, KH6APP and KG6DX were all worked. Signals were 5 x 9 plus both ways at times. Here are some details of the KG6 stations:

KG6JIH Gerry — Navy — 36 — TS600 + 4CX1500B.

KG6JDX Joe — Ford Aerospace — 33 — Swan 250.

KG6DX Joe — FTDX401 — FTV650B.

KG6APP Mac — FL400B — FTV650.

"The signal from Gerry was fantastic, he was up to 25 dB over S9. His linear runs 1400W PEP input and the antenna is a single 6 element wide spaced yagi. Gerry has worked 11 countries this year on 6 metres. KG6JIN is the only other active six metre station.

"Philippines: On 11-10 at 1230-1245Z I worked WB5LBJ/DU6 at Eloelo on Panayi Island in the Philippines. Signals were around S9 peaking to 10 dB over. Clarence runs an FTDX401 to an FTV650 to a six element yagi feet up. As far as I can determine the last VK/DU contact on six metres was in April 1970. On this occasion I heard Clarence talking to Joe KG6JDX on the low end of the band and Joe advised him to check for VK8VF. I immediately began calling CQ on 52.202 and after establishing contact we QSYed to 52.050.

"PROPAGATION: For some time now I have been of the opinion that a previously unknown mode of VHF propagation is being observed in Darwin, or at the very least a wholesale variance from published theory about transequatorial propagation.

"In the evening, contacts over long distances on this side of the geomagnetic and geographic equators have been observed regularly. I quote for example:

1. P29, KX6, C21, KG6 and DU to Darwin.
2. Channel E2 TV Ipoh Malaysia to Darwin.
3. Channel E3 TV Malaysia to Darwin.
4. Channel E4 TV Padang Indonesia to Darwin.

"These signals cross the equator at a very small angle (if any at all) and do not appear to fit into any mode of propagation described in amateur handbooks or radio engineering texts to my knowledge. The mode of propagation is associated with TEP because JA openings usually accompany an opening to these other areas. However, the TEP flutter associated with the JAs is not present.

"I suggest (or a better word would be 'think') that the mode of propagation is F2 via a highly ionized band located south of the equator. The distances involved indicate single hop F2 and fading is not present as for Es. The frequency is too low for tropospheric ducting and signals are too strong for scatter.

"If 102 MHz propagates from Darwin to JA via night time TEP and maybe 144 MHz too, it might be possible to work these other countries on two metres as well.

"This mode of propagation east west along the equator is not new. It's been observed from many years by amateurs in Darwin. I think we may be on to something new and the possibilities are interesting. The guys in KG6 are very interested and it's opened up a new 'world' on six metres to them. Most of them thought Australia was impossible. Now they are thinking of anywhere between Fiji and Singapore. It's all so exciting.

"I was advised by KG6JIH that ZS6ANE operates 50.1 MHz with 500 watts to a six over six antenna. Chaps in the south might think about that one."

What a terrific letter, Graham. It's great you should be prepared to spend the time necessary to write it all down for us here in the South. I am sure we will all look forward to hearing further from you. It would appear however, that the southern areas seem to have a chance for long distance propagation more particularly during the autumn equinox than the spring time, but even that may be open to question.

Still on six metres, Maurie VK3AVO writes to support my moves for the return of 50 to 52 MHz, and in so doing outlines some of his experiments with low power on 6 metres. He found that the former mostly valve T Vsets in his area were a disaster as far as TVI was cocnerned, even the use of a GDO produced severe local TVI with no hope of even using 10 watts.

He finds the situation now is quite different with the introduction of solid state colour TV sets with their obviously better rejection of out of band signals. Limited testing so far indicates he is not worrying his neighbours.

Maurie supports my argument all the way but it should be possible in most locations to operate on 6 metres with low power on a non-interference basis — which exists now anyway — and to prove it he has deliberately tried to induce TVI in his own CTV at very short range with a GDO, a condition which would obliterate any picture on the older sets. Provided the GDO frequency is kept well away from the video carrier frequency, and this for Channel 0 is well below 50 MHz, the interference produced is negligible or non-existent, and he sees no reason why a clean low power amateur signal, should not produce similar results. I agree, and particularly as almost every transmission today on six metres is SSB — signal without carrier, we hope it seems logical to expect a further improvement in rejection.

And are all you guys out there getting lazy? So far this month, and I do admit it is only half way through when these notes are being prepared to meet the printers' Christmas schedule, only two have written to say they support my moves for a return of the full six metre band. I would like to thank Maurie VK3AVO and Phil VK2YDY.

Phil VK2YDY writes from Moree and mentions he is now operational with 65 watts output to a 5 el. yagi on six metres SSB; 50 watts O/P to 10 el. yagi on 144 SSB; 10 watts O/P to 10 el. yagi on 146 FM; and 10 watts O/P to 15 el. yagi on 432 SSB. He is hoping to have a 4CX250B linear on 2 metres before the end of the year.

Others in Moree are Dick VK2ZVA on 6m SSB 2m SSB and FM; Dave VK2ZDY on 6m with an IC502, and hopes soon to be on 2m SSB using the 502 to a home brew transverter. The repeater VK2RAB on Ch 5 is still looking for a good home on a suitable site.

Thanks, Phil for writing, and I note you are tied to shift work, but are available most days and evenings for anyone wanting skeds to your part of the world. So why not try him sometime?

Geoff VK3AMK, in a short note, mentions that on 11-10 Steve VK3OT worked 9 JA stations on 6 metres between 0500 and 0700Z. Most call areas except JA8, signals 5 x 3. This operating took place during an exceptionally good period on 10 metres, Europeans were arriving short path and numerous solar flares observed in the previous few days. Geoff ruefully mentions there were no JA openings in Melbourne though!

MOONBOUNCE REPORT

Lyle VK2ALU reports in "The Propagator" that no tests have been scheduled since those covered in the September report.

As was prdicted earlier, terrestrial 432 MHz activity is causing QRM to EME contacts. The large amount of EME activity is covering a frequency range of 432.000 to 432.600 MHz. Moves are now afoot in the U.S.A. to reserve 432.000 to 432.050 MHz for EME work only.

REPORTING OF INFORMATION

Over the past few months a few errors or incorrect information has appeared in these columns much to my concern and that of others. The aim of the writer is to maintain the highest order of credibility at all times. In the main information has not been correct in relation to some six metre contacts in particular, so in future I will be looking fairly closely at anything reported out of the usual, and most certainly anything which arrives here about third hand onwards, with particular regard to information passed on through several hands on the air, this being the area of most error.

I don't want anyone to think I do not want to hear from you. Please continue to write as in the past and talk to me on the air by all means, but please do give me some warning if you are not sure about something. Most will appreciate I have to lean quite heavily on the information which is sent to me each month, I am unable to spend a lot of time on the air in any one month due to various commitments, and VK5 is not renowned for being a hive of activity on VHF and UHF for the greater part of the year.

So let's continue much as we have done in hte past, you write to me, I will publish what I can, but let us all try and raise the total accuracy of reporting at all levels, and I am sure we can do this without hurting anyone's feelings. Fair enough?

By the time you read this it will be approaching Christmas, and I take this opportunity to wish all **my** readers a very Happy Christmas, and may the **new** Year bring with it better tidings than those **of the** past few years spoilt by inflation and other national and local problems. As I go into my ninth successive year of being your scribe for this column may I once again thank all those kind people who have contributed during the past year much information which I have been able to pass on. As you all know I always acknowledge your names at the time of inclusion of the relevant information. There are risks in mentioning specific people but I feel I should thank particularly Graham VK8ZCJ who keeps sending lots of interesting notes, Geoff VK3AMK who also contributes often, and to Ross VK4RO who sent along a very interesting tape recording earlier.

May you all have a successful Ross Hull Memorial Contest this season, and please send in some more logs than have been arriving for the past few years. I personally am waiting to see what the points score system is like this year before saying anything further on that contentious matter at the moment.

Thought for the month: "The three stages of man: he believes in Santa Claus; he does not believe in Santa Claus; he is Santa Claus."

73. The Voice in the Hills. ■

HAVE YOU JUST BROKEN A VHF, UHF OR SHF RECORD?

If you have claim to a record and wish to have it recognised nationally or internationally, then send details of contact, including frequency, station worked, location of both stations (latitude and longitude preferred), date, time, mode, power and approximate distance claimed to Federal Executive, P.O. Box 150, Toorak, 3142.

LARA

Ladies Amateur Radio Association

This month was to be the start of a series on interesting YLs. Unfortunately the publicity officer's annual leave and a change in editorial deadlines have combined to make this impossible.

Christmas is again with us, and with Christmas comes the annual hassle of Christmas shopping. The LARA member is more fortunate than most women, who end up buying new ties and chocolates. For the other enthusiasts in the family there are radio manuals, log books, electronic magazine subscriptions, soldering irons, tools and an endless list of components including the ever popular 807. For the non-enthusiast there are radio manuals for beginners, radio course enrolments, lifetime memberships in LARA, and, when all else fails, a pair of earmuffs and a high pass filter for the television.

So far the only state to hold regular meetings is Victoria. However, membership is growing in all States and we hope that the New Year will see regular meetings beginning in other States. If you are interested please contact your local State Co-ordinator. A list of the State Co-ordinators follows:

Queensland: Linda Luther VK4VV.
Western Australia: Jill Weaver VK6YL.
Victoria: Mavis Russell VK3BIR.
South Australia: Jenny Warrington.
Tasmania: Anne Jenner VK7LY.

If you live in New South Wales how about volunteering to be State Co-ordinator. This is the only State where the position is not filled.

In conclusion LARA wishes all its members a very Happy Christmas and New Year.

73s from LARA.
Heather Mitchell VK3NFY, Publicity Officer. ■

IONOSPHERIC PREDICTIONS

Len Poynter VK3ZGP/NAC

PROPAGATION

No doubt all those who have been reasonably active during 1977 will have felt the upsurge of activity, indicating the upward trend with the new cycle really starting to assert itself. 28 MHz has QSB-ed out of the doldrums and some fine openings are taking place right across the world almost weekly.

As 1978 approaches activity will continue to climb as "ol' sol" gets into second gear, and we can look forward to many hours of fine DX on the top HF bands.

For the sunspot followers here is the year's to date monthly means, the smoothed running mean and forward predictions for the next few months.

Monthly Means: 1/77 — 15.7 2/77 — 22.6, 3/77 — 8.0, 4/77 — 13.2, 5/77 — 18.4 6/77 — 38.4, 7/77 — 21.2, 8/77 — 29.9, 9/77 — 44.1.

Running Soothed Mean: 7/76 — 12.9 (the minima month), 8/76 — 14.0, 9/76 — 14.2, 10/76 — 13.4, 11/76 — 13.4, 12/76 — 14.7, 1/77 — 16.6, 2/77 — 18.0, 3/77 — 19.7. There will probably be a further smoothing before the absolute final numbers are determined. These of course are the mathematically balanced series which go down on record as the measured sunspot cycle.

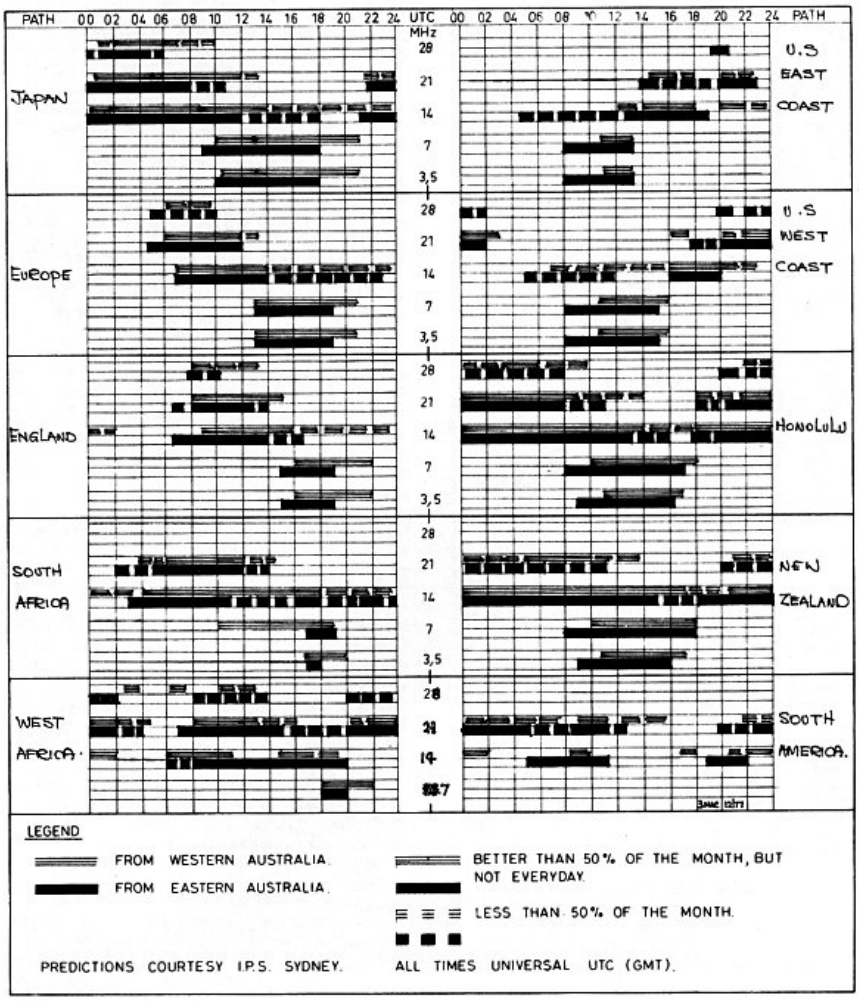
Predicted means for 12/77 — 38, 1/78 — 40, 2/78 — 42, 3/78 — 44.

Looking back across August-October period has seen a real revival on the amateur bands. As we pass through summer and head towards autumn 1978, most of the bands should be in top condition. We are experiencing quite a deal of daylight fade-outs and minor geomagnetic storms. Some lasting only a few minutes, others last for hours, but the bands bounce back quite rapidly. I guess many thought the CQ WW Phone Contest might fizz due to the storm just prior to the contest start. Whilst conditions could be better, most of the world's zones were being worked wih relative ease.

The short skip season started on October 25th right on schedule (for me), and many novices are enjoying VK and ZL contacts on 15 and 10 Mx.

Well, I trust the coming year will produce much DX — good conditions throughout the year. Keep an ear on WWV for propagation indices. If you keep your records straight you should be getting a reasonable idea of the better times to try for DX.

My best wishes to you all for Christmas and New Year 1978. May your DX be bigger and better in 1978. ■



LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Dear Sir,
This correspondence will limit its discussion to 6m repeaters. It is assumed that the fundamental reasons for repeaters are understood.

The overriding reason for 6m repeaters is to allow the amateur to follow the fundamental reason for amateur radio, that is to experiment with radio. The present restrictions on repeater experimentation are difficult to understand.

The 6m band is suffering from a lack of activity, particularly FM and in particular FM Mobile activity. Six metre repeaters will greatly increase activity on six metres. This increased activity will increase our hold on six metres; use it or lose it.

The six metre band offers better propagation over two metres and in particular for mobile operation. The flutter effect present on two metres is not present on six metres.

Amateurs with 6m FM equipment are looking to use their equipment but most agree that until 6m repeaters appear their equipment will receive little use.

Today more is known by most amateurs about 2m propagation than 6m propagation. Six metre repeaters will increase our knowledge of 6m propagation characteristics.

In summary many of the reasons for six metre repeaters will not be known until there are six metre repeaters — even Marconi remarked that he could see little practical use for radio in the future.

THOUGHTS ON A SIX METRE REPEATER BAND PLAN

Input	Output
53.05 MHz	53.65 MHz
53.1 MHz	53.7 MHz
53.15 MHz	53.75 MHz
53.2 MHz	53.8 MHz
53.25 MHz	53.85 MHz
53.3 MHz	53.9 MHz
53.35 MHz	53.95 MHz

This band plan was chosen as a compromise between repeater technical problems and mobile operation requirements. Simplex operation would be between 53.4 MHz and 53.6 MHz with a national calling frequency of 53.5 MHz.

Mrs. G. Weaver, VK6YL (Hon. Sec.). ■

AMATEUR SATELLITES

Bob Arnold

VK3ZBB

During the past twelve months our satellite reports have become increasingly technical and exciting; for the end of the year notes, perhaps we should relax a little and review the Oscar programme since its inception, to give newcomers to our branch of the amateur radio hobby some background information. What or who is Oscar?

Oscar is an acronym for Orbiting Satellite Carrying Amateur Radio which is quite self explanatory in these days of rockets, moon walks and interplanetary space travel.

Oscar 1, the first amateur satellite, was launched on 12 December, 1961, and carried a 100 mW telemetry beacon. The satellite was live for three weeks and more than 600 amateur stations submitted reports on its signals.

Oscar 2 was a similar satellite and operated for 18 days following its launch on 2 June, 1962.

Oscar 3 was remarkable, being the first "free access" satellite sent into orbit on 9 March, 1965, even before the professional Early Bird series. The transponder aboard Oscar 3 accepted signals on 144.1 MHz and re-radiated them on 145.9 MHz with a power level of 1W PEP. A telemetry beacon was also carried and over 100 amteur stations communicated through the satellite during its two weeks of operation.

Oscar 4 was launched on 21 December, 1965, and carried a 2 metre to 70 centimetre transponder. Unfortunatelfy, the satellite failed to attain its predetermined orbit, but during its limited life a dozen or more contacts were made, including the first direct satellite link between the USA and USSR.

Oscar 5 was Australia's own, being entirely constructed by a local group, led by a team of enthusiasts at Melbourne University. The satellite was designated Australis Oscar 5 and carried two telemetry channels. For the first time a control facility was carried which enabled AO5 to be commanded on or off from ground control stations. AO5 was also the first satellite to be co-ordinated by Radio Amateur Satellite Corporation (AMSAT), a newly-formed group which today has several thousand members from many countries.

Oscar 6 was launched on 12 October, 1972, as part of the payload of a Thor-Delta rocket carrying the NOAA2 weather satellite. The orbit was near polar and the orbital time of 1 hour 55 minutes allowed access to the satellite several times each day. Beacon signals were transmitted on 29.45 MHz and 435.1 MHz and the transponder had a centre input frequency of 145.95 MHz and an output frequency of 29.50 MHz. The satellite was equipped with a Codestore unit which is an 800 bit message storage unit permitting the storage or play back of up to 18 words of morse code. The Codestore enabled a range of operating parameters to be transmitted for the information of ground control stations. Oscar 6, being fitted with solar cells, operated satisfactorily until early 1977, when battery failure became apparent and restricted operation was necessary. After 22,000 earth orbits the satellite has recently been abandoned for regular use.

Oscar 7 was a more sophisticated version of its predecessor and was launched on 15 November, 1974. It is still working perfectly, having completed 14,000 orbits of similar parameters to Oscar 6. The satellite carries a Codestore unit which enables the four beacons and two transponders to be ground controlled.

The 145 MHz to 29 MHz repeater (Mode A) receives signals on a centre frequency of 145.90 MHz and re-transmits them on 29.45 MHz with a power of 2W, the beacon is located on 29.50 MHz. The 432 MHz to 145 MHz repeater (Mode B) receives its signals on a centre frequency of 432.15 MHz and re-transmits them on 145.95 MHz with a power of 8W, this beacon is located at 145.972 MHz. The two repeaters are generally operated on alternate days and the prediction in these monthly notes give the appropriate information to enable listeners and operators to assess the satellite. Also refer to AR October 1972 for more detailed information on satellite location calculations.

Operation is by CW or SSB and many Australian and New Zealand stations, together with others from more remote locations, can be heard on most orbits.

To communicate through Oscar 7 requires a recommended effective radiated power of 100W, which can be achieved with high power transmitters feeding simple ground plane antennae or lower power transmitters and higher gain antennae such as yagi or quad. The most popular up link transmitter power on Mode B, which is by far the most effective mode, is 10W PEP, but satisfactory contacts have been achieved with a power as low as 250 mW or 432 MHz.

If you have an interest in this form of communication listen around 145.95 MHz in the evening, you will find it interesting and maybe you will become involved.

The future of amateur satellites is bright. By the time you read this article it is probable that up to four Russian satellites will be in space and available for communication on Mode A.

These "System RS" satellites will be in orbits similar to the AMSAT Oscar series with an orbit period of 103 minutes.

Then in February 1978, Oscar D will be launched and will no doubt become Oscar 8 when in its designated orbit. This satellite will have transponders in Mode A and the new Mode J, which has a 145 MHz up link and 435 MHz transmitter.

Under construction by various groups around the world is the advanced Phase 3 satellite due for launching in December 1979. In addition to the usual radio and command facilities, this Oscar will carry an on-board rocket which will be used to place the satellite in a predetermined eliptical orbit, the apogee of which will gradually move towards the equator. This feature will permit communication over far greater distances than at the present time and over a period of years give Australian stations access to many parts of the north Pacific area as well as Africa and South America.

I hope this resume will awaken interest in satellite communication by amateur and VHF listeners. In each future edition of "Amateur Radio" I hope to give updated information on the progress of our satellites with stop press news via the Divisional broadcasts.

Perhaps I shall have the pleasure of contacting you via one of the "birds" — if you can only listen, SWL reports on my signals will be welcomed and acknowledged.

DECEMBER 1977

OSCAR 6				OSCAR 7			
Orbit	Date	Time	Lon. °	Orbit	Date	Time	Lon. °
23446	3	00.30	72.60	13923	1	01.20	75.19
23459	2	01.25	86.35	13935	2	00.19	60.07
23471	3	00.25	71.35	13948	3	01.13	73.69
23484	4	01.20	85.10	13960	4	00.12	58.19
23496	5	00.20	70.10	13973	5	01.07	71.19
23509	6	01.15	83.85	13985	6	00.06	57.07
23521	7	00.15	68.85	13998	7	01.00	70.69
23534	8	01.10	82.60	14010	8	00.00	55.57
23546	9	00.10	67.60	14023	9	00.54	69.19
23559	10	01.04	81.35	14036	10	01.48	82.81
23571	11	00.04	66.35	14048	11	00.48	67.69
23584	12	00.59	80.10	14061	12	01.42	81.31
23597	13	01.54	93.85	14073	13	00.41	66.19
23609	14	00.54	78.85	14086	14	01.35	79.81
23622	15	01.49	92.60	14098	15	00.35	64.69
23634	16	00.49	77.60	14111	16	01.29	78.31
23647	17	01.44	91.35	14123	17	00.28	63.19
23659	18	00.44	76.35	14136	18	01.23	76.81
23672	19	01.39	90.10	14148	19	00.22	61.69
23684	20	00.39	75.10	14161	20	01.16	75.31
23697	21	01.34	88.85	14173	21	00.16	60.19
23709	22	00.34	73.85	14186	22	01.10	73.81
23722	23	01.29	87.60	14198	23	00.09	58.69
23734	24	00.28	72.60	14211	24	01.03	72.31
23747	25	01.23	86.35	14223	25	00.03	57.19
23759	26	00.23	71.35	14236	26	00.57	70.81
23772	27	01.18	85.10	14249	27	01.51	84.43
23784	28	00.18	70.10	14261	28	00.51	69.31
23797	29	01.13	83.85	14274	29	01.45	82.93
23809	30	00.13	68.85	14286	30	00.44	67.81
23822	31	01.08	82.60	14299	31	01.38	81.43

■

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
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FOR SALE

National NCX-3 Transceiver, plus AC power supply, all in good going condition. Suitable Novice, etc., $250. VK2BMP, QTHR. Ph. (02) 90 3066.

Drake R4C Rx, T4XB Tx, MS4 spkr, $1,000. Also $250. Yaesu 620B 6m SSB transceiver, $480. VK5AS, QTHR. Ph. (086) 82 2899.

TCA1674 2m FM Transceiver, complete with xtals for ch 40, mic and crable, 25W output, $45. VK2BSM. Ph. (02) 62 4492 (A.H.) or VK2NED, QTHR.

G09 Tx, as is, what offers? VK3EJ. Ph. (03) 735 1350 for full information and/or to arrange inspection.

Eyer 66 Tape Recorder (3¾, 7½ in IPS), complete with radio tuner, in first class condition, $300. National panasonic cassette recorder, model RQ-306S (new), $40. Marconi marine HD morse key, $85. Type 365EZ (new), $85. Pioneer stereo headphone, SE305, new, $30. J. Nairn, PO box 29, Churchill. Ph. (051) 22 1997.

Yaesu FT220 FM/SSB Transeiver with anti-repeat mod, $400. FT620 AM/SSB transceiver, $350. FT dx 560 transceiver, $325. VK3ANY, QTHR. Ph. (051) 34 5384.

Collins 51J4 Comm Rx, complete with handbooks but less external speaker box, in unmodified condition, $300, ONO. VK3YY, QTHR. Ph. (03) 97 1235.

Yaesu FR-100B amateur bands Rx, $165 Tower, 28 ft, self-supporting steel on 6 ft base, $30. Mast, 50 ft 3 section telescopic, $50. Mast, 30 ft Hill's telescopic, $25. Hygain vert antenna, 14 AVQ, 10-40m, $40. Bob, VK3AOT, QTHR. Ph. (03) 697 6612 (Bus.), (03) 787 6426 (A H).

AR88D (unmodified) an manual; Kleinschmidt teleprinter AN/FGC-25 and manual; BC221; ART-13 Tx; 2 off APX-6; P/S 1200V at 500 mA. VK3TY, QTHR.

Yaesu FL100B, CW AM SSB (mech filter) Tx, 120W output all bands, 80 to 10m, with manual, $170. Yaesu 2S mic compressor, $15. Both units for $175. VK3WY, QTHR.

Yaesu FTV-250 Transceiver. complete with cables and manual, EC, $175. Xtal XCB7, 23 ch. CB, $50. Yaesu FL50 SSB Tx, complete with FV-50 VFO, modified for operation on 52-52 5 MHz, $55, ONO. Yaesu FL50 SSB Tx, complete with FV-50 VFO, modified for operation on 144-144.5 MHz, $55, ONO. Drake 2B Rx, ham bands only, 80-10m, with Q multiplier, calibrator, 240V, $120, ONO. ICOM IC502, 6m, SSB, EC, $175, ONO. Lionel VK3NM, QTHR. Ph. 329 7888 (Bus.), 88 3710 (A H)

Free two 20 ft telescoping triangular tower sections — never used, need finishing. Philips 50 MHz type 1676 transceiver with 6m AM net crystal, $30. VK3SM, QTHR. Ph. (03) 386 4406.

Europa B 144/28 MHz Transverter, complete with handbook, as new, $180. Plugs into most Yaesu gear such as FT101, FT200 etc. VK2AHH, QTHR. Ph. (065) 62 6213 or (065) 62 4760 AH.

Brand new Atlas 210X Solid State SSB Transceiver with noise blanker, Atlas 240V Deluxe AC console speaker, Atlas Deluxe mobile mount, Atlas 10X 10 ch xtal oscillator, Shure 404C microphone, Mark Anixer helical mobile antennas for 80-40, 20m with deluxe mobile base. All equipment brand new in factory sealed cartons, $1,250.00. Also brand new Wilson WE-800 2m FM portable synthesised radio, 1W and 12W switchable output, complete with nickel cadmium batteries, frequency range 144-148 MHz. Also five pre-set channels, $399.00. VK2JO, GPO Box 5076, Sydney, 2001. Ph. (02) 35 7756.

Drake TR4C 300W input SSB transceiver with Drake AC-4 AC power supply, commun spkr, dynamic mic, complete with owners manual, full 10m coverage, very little used, as new condition, $650. John Berry Ph. (02) 389 6790 AH (02) 389 6455 bus.

Vintage Valves, Nos. 15 to 866. Series A415, PM2, 1D4, CL4, EK2, 7C5, 25A6, metal 6 and 12V, new, boxed and used. Vibrators, eliminators, dials, spkrs, etc. Restorers and collectors — SAE for list, state your needs. VK3DS, QTHR.

Tri-Band X Beam (see AR Oct '72), $50. WIA 2m pre-amp and converter, $25. VK3AHG, QTHR. Ph. (03) 288 2024.

Yaesu FT101E, hardly used, as brand new, complete with mike, etc., in carton, full warranty extended, $575. VK4ZT, QTHR.

Yaesu FT200-FP200, complete unit, in excellent condition, full 10m cover, PTT mike, outboard homebrew solid state speech processor, spare tubes, handbook, just completely agent-checked and in A1 working order, $340. Yaesu FL2000B linear amp. pair 572B in GG, covers 80 thru 10m — little used, in good condition, handbook, $300. VK3ZM, QTHR. Ph. (03) 689 3135.

Atlas 210B, very little used. 80m-10m, $600 ONO. VK6GT, PO Box 171, Paraburdoo, WA 6754.

Yaesu Musen FRG-7 comm. Rx, good condition, $240 ONO. Trio CO-1303D 5 MHz oscilloscope, as new, $185. VK2NCK, QTHR. Ph. (02) 604 7137.

Self-Contained Novice Amateur Licence Study Kit. Contains two theory texts (Elementary 1 text and famous Westlakes manual). These allow easy learning while text of 1000 multiple choice questions allows constant testing. Two C60 learning morse cassettes and study guide provide expert morse help. Kit handbook provides all information about using the kit and applying for exams. Complete kit $15 post free. D. Wilson Y.R.S. Education Officer VK2ZCA, 63 Superior Ave., Seven Hills, 2147.

Swan 350, with matching Swan 240 AC & 12V DC power supplies. In good order, $290. Ed. Driscoll VK2BI, QTHR.

FT620 6m SSB/AM transceiver, fitted with xtls for 51.5-54 MHz, $365. Ph. (03) 544 9955 ext. 295, between 7.30 p.m. and 9.30 p.m. and ask for Alan Woods.

Kenwood TS700A 2m all mode txcvr, mint condition, $570 ONO. Multi-7 2m FM txcvr with repeater 2, 4, 6, 7, 8, reverse 2, 3, 4, 6, 8, simplex 40 & 50, $165 ONO. David VK1ZDF, QTHR. Ph. (062) 63 3419 bus.

Uniden 2020, matching speaker and remote VFO, first class condition, in original cartons, $175.00. VK3TG, QTHR. Ph. (058) 52 1636.

WANTED

14AVQ or 4BTV Vertical Antenna for Scout group. VK3BMP, QTHR. Ph. (02) 90 3065, price and details.

Rx 75A-4, SP600JX, RO60 or similar Rx. Also transceiver HW7, Argonaut or old army transceiver in original condition. VK5QQ, QTHR.

Antenna, 18AVT or similar, 10-80m, vertical. Reg Nicholls VK2NFY, QTHR. Ph. (02) 713 9719.

VHF, UHF and SHF Rxs, Txs, radar, etc., valves type RL18, 955, 2C39, 2C40, 2C42, 2C46, thyratron type 3C45; coils to suit Tx type TA-2J-24; old QST, radio and hobbies and general amateur radio magazines. VK2ZHS, QTHR. Ph. (02) 59 5390.

Special Morse Class, for limited operators, 5 intensive nights before the Feb. exam! Mon., 23 Jan.-Fri., 27 Jan., 1978, 6-8 p.m. ITU and hand key practice and simulated exams. At Box Hill Tech. College, 16 persons max. Contact Graeme Scott VK3ZR. Ph. 89 938 (office hours).

TH3 Junior Beam, Monitorscope suitable for FT 101B, and a SWR bridge — Oscar or similar, operational to at least 150 MHz, in good working order. VK3AKU, QTHR. Ph. (03) 598 5892.

Simplex hand morse keyer, 455 kHz, ex AMR 101 Rx, variable capacitors, miniature/HF types for cash or exchange new 832's, or QQE04/20. VK2IS, QTHR.

Two dial mechanisms ex BC 221 Frequency Meter, preferably inclusive capacitor. VK5KI, QTHR. Ph. (08) 264 1902.

Remote VFO Calibrator unit and VOX card for Galaxy V. VK5ZE, QTHR. Ph. (08) 255 7586 AH.

Old Time Radio Programs — will exchange. Tapes of vintage Australian overseas programs and commercials, also interested in movie posters and stills. Tom King VK2ATJ, QTHR.

Your interest in Novice Studies. A text of 1000 multiple choice revision questions covering regulations and theory with answers. Price posted $3.00. D. Wilson Y.R.S. Education Officer VK2ZCA, 63 Superior Ave., Seven Hills, 2147.

QSP

HISTORY OF RAAF RADIO ORGANISATION

A letter received from Gp. Capt. E. R. Hall of 17 Orchard Crescent, Box Hill North, Victoria 3129, advises he has written a book entitled "A Saga of Achievement", due to become available early next year. The book sets out to present an accurate and reasonably adequate account of the origins of the RAAF radio organisation and includes much material not previously appearing in print. The book, which will include many photographs, covers the period from 1916 to the late 1960s. The RAAF Wireless Reserve was conducted for many years under the auspices of the WIA and its members went on to make an outstanding contribution to radio successes during World War II. The total print run will be limited to copies ordered prior to publication, providing these are received by about the end of the year.

SILENT KEYS

It is with deep regret that we record the passing of —

LIONEL (LEE) DEVEREAUX CUFFE ZL1OB ex VK2AMA/VK2MA/VK2XC (1939-48)

Born in Whakatane, NZ, 1910, Lee moved with his parents to Australia, and was first licensed March 1939 with the call VK2AMA. He made contacts before war broke out, mainly CW on 20 metres. After the war he was given a Class B licence and call sign VK2AM, operating from the old QTH in Mosman, NSW. Again operation was on 14 MHz and some 618 contacts were made before he was closed down, in May 1950. Lee returned to NZ and sat his AOCP and received certificate number 4077, and the call ZL1OB was issued in Whangarei. Operation was again mainly CW on HF froh his home on the Whangarei Harbour. A member of NSW Division WIA in 1946, Lee was a member of the Northland Branch NZART until his Key fell silent earlier this year. Sincere sympathy is extended to his wife.

WALTER SALMON VK2SA
"The Last of the Homebrewers"

It is with deep regret that I record the passing on of VK2SA Walter Salmon on 14/8/1977, who was a world-wide radio identity. Walter Salmon, QPM, JP, retired from the position of Metropolitan Superintendent of Police (Sydney) in 1962, after having acted in the position of Assistant Commissioner prior to his retirement. He then joined the Sutherland Bowling and Recreation Club and served on several committees and became their publicity officer for the last five years, as well as being their official photographer. Wal obtained his amateur licence in 1924 but his radio interests were commenced well before then, as he was a radio operator at sea in 1915 at the age of 17.

An outstanding achievement of Wals' was when he had mobile radios installed in the Sydney police motor vehicles and became the Head of the Police Wireless Division. Incidentally, the installation and maintenance was conceived and managed by Wal and was unique in so far as it was the first such installation in the southern hemisphere. Besides being a competent technical and theoretical radio man, Wal was an efficient literary man and was able to dicument his work. Many articles have been published in the journal of the Institute of Radio Engineers of which he was a member. He also submitted articles for publication in the Amateur Radio magazine and in 1966 he was awarded the "Adams" trophy for the best technical article published that year.

In 1976 his continued interest in radio was manifest by a lecture he gave to the St George Amateur Radio Society in September, in which he described what he called the St. George 2 metre aerial. An antenna which he developed after having revived his interest in 2 metre operation by purchasing an IC 22A, the only amateur radio set he ever bought. His shack is full of "home brew" gear with which he has so successfully pursued his hobby with amateurs throughout the universe.

Yes, it is with profound regret that I record the passing of VK2SA, a great friend who became known to me through the medium of Amateur Radio. To Sheila, his wife, their daughter, sons, daughter-in-law and grandchildren, we all extend our sympathy.

Alf VK2AAC.

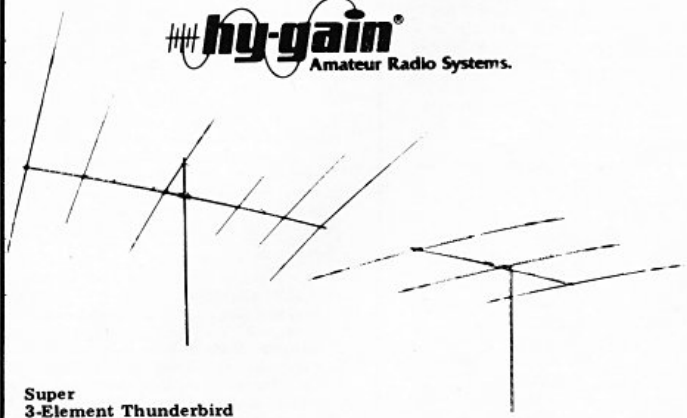
ANTENNAS & ACCESSORIES

JAYBEAM VHF/UHF BEAM ANTENNAS

Model	5Y/2M	8Y/2M	10Y/2M	10XY/2M	18/70	48/70	88/70	D8/70
Type	yagi	yagi	yagi	X yagi	yagi	yagi	yagi	twin
Band	2m	2m	2m	2m	70cm	70cm	70cm	70cm
Gain dBd	7.8	9.5	11.4	11.3	14.9	15.7	18.5	12.3
No. of el	5	8	10	10	18	48	88	2x8
Horiz beam width	58°	47°	37°	38°	28°	26°	19°	45°
Max power	1Kw	1Kw	1Kw	1Kw	1Kw	1Kw	1Kw	1Kw
length metres	1.6	2.8	4.4	3.6	2.8	1.83	3.98	1.1
Mass Kg	1.8	3.8	4.5	5.9	3.4	2.7	4.7	2.5
Impedance Ohms	50	50	50	50	50	50	50	50
Price	**$30**	**$39**	**$59**	**$72**	**$64**	**$64**	**$75**	**$48**

There is no substitute.

hy-gain® Amateur Radio Systems.



Super 3-Element Thunderbird for 10, 15 and 20 Meters Model TH3Mk3 — $249

Hy-Gain's Super 3-element Thunderbird delivers outstanding performance on 10, 15 and 20 meters. The TH3Mk3 features separate and matched Hy-Q traps for each band, and feeds with 52 ohm coax. Hy-Gain Beta Match presents tapered impedance for most efficient 3 band matching, and provides DC ground to eliminate precipitation static. The TH3Mk3 delivers maximum F/B ratio, and SWR less than 1.5:1 at resonance on all bands. Its mechanically superior construction features taper swaged slotted tubing for easy adjustment and larger diameter. Comes equipped with heavy tiltable boom-to-mast clamp. Hy-Gain ferrite balun BN-86 is recommended for use with the TH3Mk3.

	TH6DXX	TH3Mk3
Electrical		
Gain—average	8.7dB	8dB
Front-to-back ratio	25dB	25dB
SWR (at resonance)	Less than 1.5:1	Less than 1.5:1
Impedance	50 ohms	50 ohms
Power rating	Max legal	Max legal
Mechanical		
Longest element	31.1'	27'
Boom length	24'	14'
Turning radius	20'	15.7'
Wind load at 80 MPH	156 lbs.	103.2 lbs.
Maximum wind survival	100 MPH	100 MPH
Net weight	57 lbs.	36 lbs.
Mast diameter accepted	1¼" to 2½"	1¼" to 2½"
Surface area	6.1 sq. ft.	4.03 sq. ft.

6-Element Super Thunderbird DX for 10, 15 and 20 Meters Model TH6 DXX $320 Separate HY-Q traps, featuring large diameter coils that develop an exceptionally favorable L/C ratio and very high Q, provide peak performance on each band whether working phone or CW. Exclusive Hy-Gain beta match, factory pretuned, insures maximum gain and F/B ratio without compromise. The TH6DXX feeds with 52 ohm coaxial cable and delivers less than 1.5:1 SWR on all bands. Mechanically superior construction features taper swaged, slotted tubing for easy adjustment and readjustment, and for larger diameter and less wind loading. Full circumference compression clamps replace self-tapping sheet metal screws. Includes large diameter, heavy gauge aluminum boom, heavy cast aluminum boom-to-mast clamp, and heavy gauge machine formed element-to-boom brackets. Hy-Gain's ferrite balun BN-86 is recommended for use with the TH6DXX.

	$249 TH3JR
Electrical	
Gain—average	8dB
Front-to-back ratio	25dB
SWR (at resonance)	Less than 1.5:1
Impedance	50 ohms
Power rating	600 watt PEP
Mechanical	
Longest element	24.2'
Boom length	12'
Turning radius	14.3'
Wind load at 80 MPH	87 lbs.
Maximum wind survival	80 MPH
Net weight	21 lbs.
Mast diameter accepted	1⅝"
Surface area	3.4 sq. ft.

VICOM are proud to have been appointed Australian distributors for **NAGARA** quality ham antennas. This month we introduce the **NAGARA** self-supporting HF trap verticals:

NEW TRAP VERTICALS!

80 thru 10m

MODEL V5Jr 5 band trap vertical;
Height: 6.7m
Weight: 2.3Kg
Wind surface: 0.15 sqm
Max power: 1Kw pep
Impedance: 52 ohms
Price: **$109**

NEW

40 thru 10m

MODEL V4Jr 4 band trap vertical;
Height: 5.2m
Weight: 1.8Kg
Wind surface: 0.10 sqm
Max power: 1Kw pep
Impedance: 52 ohms
Price: **$89**

NEW

EACH KIT CONTAINS A TUBE OF PENATROX AND TENA COAT TO ENSURE LONG-LIFE ANTENNA SERVICE.

Also NEW 6 m 5 element beam, Model SD-56. **$98**

MARK HF HELICALS

The Mark range of top loaded whips employ a carefully proportioned helical conductor featuring advanced design principles. The load is concentrated at the top and produces the important 50 ohm match at reasonant frequency. A tough dielectric plastic covering eliminates static interference from the precipitation effect and a subsequent improvement in signal to noise ratio and receiver sensitivity.

Model	Res. Freq.	Bandwidth	Length	Price
HW80	3.6MHz	50KHz	6 ft.	$30
HW40	7.07	199KHz	6 ft.	$30
HW20	14.2	250KHz	6 ft.	$30
HW15	21.2	500KHz	6 ft.	$30
HW10	29.0	1MHz	6 ft.	$30

Spring base $13
HWM-1 moulded base $17.50

PARABOLIC DISH UHF–SHF

This professionally engineered dish handles both 430MHz and 1.2GHz with high wind velocities.

	430MHz	1.2GHz
Gain	12dB	20dB
Beam with	20	8
F/B ratio (horiz)	22dB	30dB
F/S ratio (horiz)	40dB	40dB
VSWR	less than 1.3	
Max power	1Kw CW	
Max wind velocity	50m/sec	
Input impedance	50 ohms	
Dish Diameter	1.2m	
Net Weight	4KG	
Price	$349	

DAIWA

2 METER FM ANTENNAS

Lindenow 5/8 wave, quality construction	$26
— base for above	$ 3
42S ¼ wave whip with cable	$14
82D 5/8 wave stainless-steel with cable	$26

The **RINGO RANGER ARX-2** is a 2M gain omni-directional antenna with three half-waves in phase and a one-eight wave matching stub. The Ringo Ranger gives an extremely low angle of radiation for better signal coverage. It is tunable over a broad frequency range and perfectly matched to 52 ohm coax. Price **$49.**

RINGO RANGER ARX-2

4dB gain with reference to half-wave dipole.
6dB gain with reference to quarter-wave whip.

TRAP DIPOLES

Midy VN 80 thru 10m	$67
AL48DXN 40/80m, 2Kw	$54

Midy-V N

ART-3000C

ART8000 King Kong	$478
ART3000C heavy duty	$199
AR22XL light duty	$109
8-core cable per m	$1.40

ROTORS

MODEL NO.	ART-8000	ART-3000C
Rotating Torque	2,500kg/cm	850kg/cm
Braking Torque	10,000kg/cm	1,700kg/cm
Maximum Vertical Load	2,500kg	250kg
Control Accuracy	±5°	±5°
Forward/Reverse Delay	3 seconds	3 seconds
Maximum Continued OP.	20 minutes	3 minutes
Mast Clamp	48 ϕ ~ 78 ϕ	34 ϕ ~ 55 ϕ
Cable Requirement	9 conductor	8 conductor

BALUNS

AS-BL (Asahi) for beams	$ 31
BN-86 (HyGain) for beams	$ 30
BL50A (Rak) 50 ohm, 4Kw, for dipoles	$ 25
BL70A (Rak) 70 ohm, 4Kw, for dipoles	$ 26

COUPLERS

CL65 500w, 2.5 thru 29MHz	$134
CL99 200w, 2 metres	$ 61
CSW216 incl. swr/pwr. meter, 3.5 to 28MHz	$219

SWR

VC2 twin meters, 3-150MHz, 50 ohms	$ 38
SWR200 Oskerblock 3-200MHz	$ 75
SWR410A, 140-500MHz, quality	$ 98

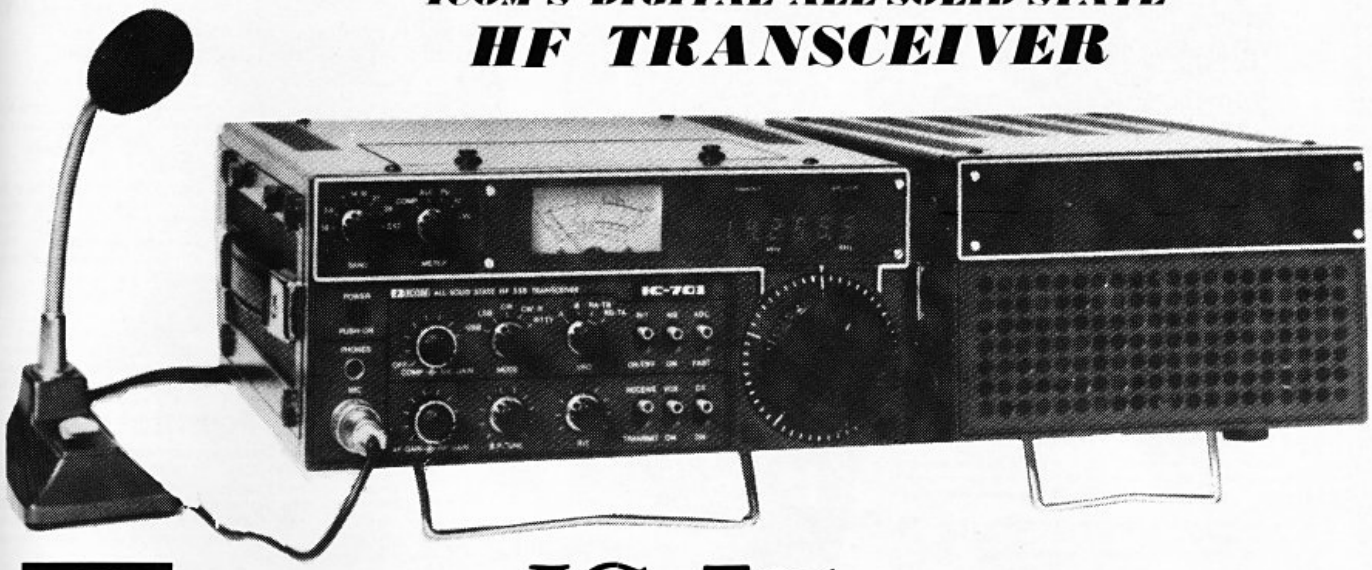
NOISE BRIDGE

Te7-01 Omega up to 100MHz	$ 40
Te7-02 Omega up to 300MHz	$ 55

LOW PASS FILTERS

FD30M 32MHz cut-offs, 1Kw pep. max.	$ 35
FD30LS 32MHz cut-offs, 200w max.	$ 20

ICOM'S DIGITAL ALL SOLID STATE
HF TRANSCEIVER



IC-701

THE ULTIMATE!

ICOM's advanced technology and huge success in the VHF market enable us to introduce the most advanced HF transceiver today, with ICOM quality and value.

Check the features and you'll see why the IC701 is . . . THE ULTIMATE.

- All solid-state
- 100w continuous all bands, all modes
- Dual Built-in individual VFO's offering split frequencies
- 160m thru 10m coverage
- USB, LSB, CW, CW-N (narrow), RTTY
- Speech processor
- Band pass tuning
- Receiver triple conversion
- VOX, semi break-in CW, RIT, AGC, NB
- Built-in DC power supply with optional AC unit
- Full line of accessories to come
- Backed by VICOM technical support and expertise together with 90 day warranty

CHECK THESE FEATURES

Number of semiconductors	:	125 transistors, 22 FET, 57 ICs, 248 diodes
Frequently coverage	:	1.8-2.0, 3.5-4.0, 7.0-7.3, 14.0-14.35, 21.0-21.5, 28.0-30.0MHz
Transmitter	:	Power 100w (output) adjustable 0-100w Emission: A1, A3J, F1
Spurious and Harmonics	:	Better than 60dB below peak power
Carrier suppression	:	Better than 40dB down
Unwanted sideband	:	Better than 40dB down at 1000 Hz AF input
Microphone	:	600 ohms
Rx IF frequencies	:	9.0115MHz, 10.7016MHz, 9.0115MHz
Sensitivity	:	Better than 0.25uV for 10dB S+N/N
Selectivity	:	SSB. RTTY + 1.1 KHz at -6dB (Adjustable to + 0.5KHz Min.) + 2.0KHz at -60dB CW + 250Hz at -6dB + 700Hz at -60dB CW-N + 100Hz at -6dB + 500Hz at -60dB (with Audio Filter)
Receiver spurious Response Rejection	:	Better than 60dB
Audio output	:	1.5 watts

The IC-701, the one you've waited for, the ULTIMATE.

COMING SOON!

IC701 TRANSCEIVER $1160
IC701PS optional AC supply $239

VICOM ham catalog VICOM ham catalog VICOM

VICOM ham catalog VICOM ham catalog VICOM

The 2m all-mode **IC211** features twin optically-coupled VFOs! with 7 segment LED readouts, handled FM, USB, LSB and CW operation. Ac/dc, complete with mci, handbook, **VICOM** 90 ddy warranty. Price **$785.**

ICOM

IC22S

FM mobile

THINK HARD BEFORE YOU BUY

Buying yourself a 2m fm mobile rig is quite an expensive exercise and it is well worth taking time off to think and put down a few comparisons before you buy. The **IC22S** has some great features which include:

- **No hassles** with mobile operation, no difficult to read digital displays or maze of knobs.
- **Synthesiser** with programmable 25KHz frequencies 146-148 MHz. Units come pre-wired for R1-8, 40, 50 and 51.
- Lends itself to **experimentation** in digital logic-scanners, external programmers, etc.
- **ICOM quality** and reliability backed by VICOM technical support including 90 day warranty.
- Price – well a real bargain at **$279!**

FOR FULL DETAILS WRITE FOR OUR ICOM CATALOG.

IC245 fm/ssb mobile

IC245

The VFO revoltuion goes mobile with the unique ICOM developed synthesiser with 40 digit LED readout. Covers 146-148MHz in 5KHz steps for FM and with the optional sideband adapter the step rate scrops to 100Hz from 144 to 146MHz. Your new **IC245** will give you the most for mobile. Price **$489.**

ATLAS

ATLAS 350XL s/state base stn.	$1199
ATLAS 350PS matching AC supply	$ 285
ATLAS 210X 80 thru 10m	$ 969
ATLAS 215X 160 thru 15m	$ 969

uniden

Uniden 2020 Mk2 HF transceiver	$849
Uniden 8010 digital VFO	$159
Uniden 8020 matching speaker	$ 49

YAESU

FT101E HF transceiver	$859
FL2100B HF linear amp.	$578
FT301D HF solid-state	$1149
FRG-7 communications receiver	$338

KENWOOD

pacesetter in amateur radio

TS820S HF transceiver including digital display, mic	$1105
TS520S HF transceiver with mic	$705
VFO820 external VFO for TS820S	$ 155
DS-1 dc/dc power supply	$ 70
YG-886C crystal filter for TS820S	$ 64
YF-399C cystal filter for TS520S	$ 64
SP520/820 matching speaker	$ 36
TV502 2m transverter	$ 260
TV506 6m transverter	$ 229
TS600 6m transceiver	$ 759
TR3200 70cm fm transceiver	$ 299
TR7400 2m fm digital transceiver	$ 450
MC50 desk microphone, dynamic	$ 54
MC10 ptt hand mic, dynamic	$ 14

COMING SOON

TS700S 2m all-mode, digital display
TL-922 HF linear, 2Kw input
TR-7500 2m fm synthesised

WHAT A GREAT PAIR! ICOM

Hold it!

Take hold of the great pair of SSB twins, the **IC202** and **IC502** transceivers. Three portable watts on two metres or six!

HELLO 6M DX

Yes, the 6m DX season is now on. The **IC502** is ideal for your own experimentation on this band. The **IC502** covers 52-53MHz with VFO control, RIT, effective noise blanker, provision for external power and antenna and comes complete with carry-strap, mic. and English manual. Backed by **VICOM** 90 day warranty. Price **$219.**

OSCAR

The **IC202** is the ideal 2m exciter for those long-haul DX contacts or to work Oscar. 3 watts ssb and cw, VXO control, quality manufacture and comes complete with English manual, carry-strap, mic. and **VICOM** 90 day warranty. Price **$219.**

2M FM PORTABLES

IC215 FM portable puts the good times on the go. Take it to the beach, climb a hill, the long-lasting batteries make fm portable really portable. Features collapsible antenna, 15 channel capacity, dual power, crystals identical to the IC22 series. Your new **IC215** comes complete with 3 popular channels, mic. shoulder-strap, batteries and English manual. Price **$219.**

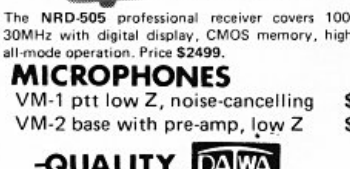
ACCESSORIES FOR THE PORTABLES

Rubber Ducky 2m antennas	$ 13
Mobile bracket for portables	$ 18
BC-20 nicad pack and reg.	$ 57
IC3PS power supply stand	$ 27
IC50L 6m linear amp, 10 watts	$ 98
IC20L 2m linear amp, 10 watts	$ 98

HAL

KSR3000 RTTY terminal incl. video	$1499
ST6000 FSK/demodulator with cro	$1031

RECEIVER



The **NRD-505** professional receiver covers 100KHz thru 30MHz with digital display, CMOS memory, high stability, all-mode operation. Price **$2499.**

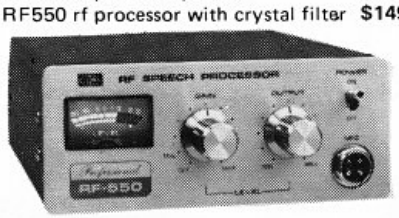
MICROPHONES

VM-1 ptt low Z, noise-cancelling	$8.90
VM-2 base with pre-amp, low Z	$29.80

QUALITY DAWA

PROCESSORS and COMPRESSORS

MC330 audio mic compressor	$ 71
RF440 rf processor, ac/dc	$112
RF550 rf processor with crystal filter	$149



SOLID STATE FET VOMs

Model 150 Solid State FET VOM

Super sensitivity makes it suitable for any application in the field or on the bench.

*11 megohm input resistance on all dc volt ranges
*1 megohm input resistance on all ac volt ranges
* temperature compensated for high accuracy
* built-in overload protection.

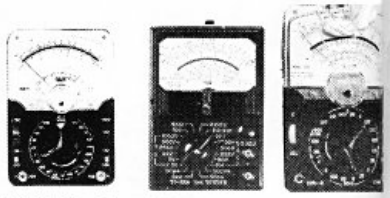
DC volts: 7 ranges, 0.25 thru 1000 volts
AV volts: 4 ranges, 2.5 thru 1000 volts
DC amps: 5 ranges, 0.025 thru 250mA
Resistance: 5 ranges to 5000megohms
Decibels: 4 ranges
Complete with comprehensive instructions, leads and batteries.

20,000 ohms/volt General Purpose
Model TP-5SN

Accurate and dependable, 6 dc ranges, 5 ac ranges, 4 current ranges, 4 resistance ranges, capacitance and decibel ranges also. Price of **$29** incl. instructions and test leads.

DELUXE MIRROR SCALE MODEL 200
20,000 ohms/volt on 6 dc volt ranges.
10,000 ohms/volt on 5 ac volt ranges.

Readings for capacity, resistance, decibels, advanced multimeter for the professional, serious hobbyist or for the school lab. Price of **$29** is a bargain for this quality instrument! Incl. comprehensive instructions and test leads.



TUBES for Tx

6JS6C	$12	6146B	$11
6KD6	$14	572B	$50

HI-MOUND MORSE KEYS

HK702 deluxe, marble base	$ 35
KH708 economy model	$ 19
HK706 operators model	$ 20
MK701 manipulator	$ 38
EK103W electronic keyer	$159

QM70 PRODUCTS

2M6432 transverter	$125
2M linear, 70w pep	$119
28/144 "Scorpion" transverter	$225
432/28 converter	$ 50
144/28 converter	$ 45
1296/28 converter	$ 59

TRANSCEIVERS & ACCESSORIES FROM VICOM

VICOM

VICOM *international Pty. Limited is an Australian Company owned and controlled by licensed Amateur Radio operators who understand the Amateur's desires as well as professional conduct in business. We offer the same to our purchasers of our products whether they be the Military or hams. Being active Amateurs ourselves, we demand an organised, qualified, well-equipped service facility to support the complex equipment we purchase.* **VICOM** *dealers are also licensed hams and are able to solve any problem that may occur and are well stocked for spares for most of the major brands.* **VICOM** *is a healthy, growing company and fully recognises its responsibility to provide customers the support and constancy to put them at ease. Careful planning, attention to detail and response to customers needs have been material in its rapid rise to success. A long future of continued planned growth and success is ahead.*

SPECTRUM ANARCHY

The law provides that a licence be held to use transmitting equipment. Customers are warned that evidence indicating an appropriate certificate of proficiency may be required when making purchases. Please, help stamp out spectrum anarchy, especially on our Amateur frequencies.

PRICES

All prices shown are correct at the time of compiling this catalogue but are subject to change without notice. Prices may be slightly higher from interstate dealers to cover freight costs. Prices include sales tax but exclude freight and insurance.

SERVICE

VICOM are experienced in serving the most complex of equipment. Our labour rate is $20 per hour, minimum one hour.

WARRANTY

All new equipment sold by **VICOM** carries a 90 day warranty. Please note that the warranty covers labour and materials but excludes final transistors, damage due to polarity reversal or excessive voltage, tampering and negligent use.

MAIL ORDER

We offer a speedy mail order service throughout Australia, New Zealand and New Guinea. Goods are despatched freight collect via Ansett, Kwikasair, registered post or rail, as requested.

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Finance can be arranged for approved buyers.

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INDEX OF ADVERTISERS

DRAKE®

C-Line Amateur Equipment

$795

Drake R-4C

Solid State Linear permeability-tuned VFO with 1 kHz dial divisions. Gear driven dual circular dials. High mechanical, electrical and temperature stability.

Covers ham bands with crystals furnished. Covers all of 80, 40, 20 and 15 meters, and 28.5-29.0 MHz of 10 meters.

Covers 160 meters with accessory crystal. In addition to the ham bands, tunes any fifteen 500 kHz ranges between 1.5 and 30 MHz, 5.0 to 6.0 MHz not recommended. Can be used for MARS, WWV, CB, Marine and Shortwave broadcasts.

Superior selectivity: 2.4 kHz 8-pole filter provided in ssb positions. 8.0 kHz, 6 pole selectivity for a-m. Optional 8-pole filters of .25, .5, 1.5 and 6.0 kHz bandwidths available.

Tunable notch filter attenuates carriers within passband.

Smooth and precise passband tuning.

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Usb, lsb, a-m and cw on all bands.

Agc with fast attack and two release times for ssb and a-m or fast release for break-in cw. Agc also may be switched off.

New high efficiency accessory noise blanker that operates in all modes.

Crystal lattice filter in first i-f prevents cross-modulation and desensitization due to strong adjacent channel signals.

Excellent overload and intermodulation characteristics.

25 kHz Calibrator permits working closer to band edges and segments.

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Drake MS-4 Matching Speaker for use with R-4, R-4A, R-4B and R-4C Receivers. (Has space to house AC-3 and AC-4 Power Supplies).

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Solid State Linear permeability-tuned VFO with 1 kHz dial divisions. Gear driven dual circular dials. High mechanical, electrical and temperature stability.

Covers ham bands with crystals furnished. Covers all of 80, 40, 20 and 15 meters, and 28.5-29.0 MHz of 10 meters.

Covers 160 meters with accessory crystal. Four 500 kHz ranges in addition to the ham bands plus one fixed-frequency range can be switch-selected from the front panel.

Two 8-pole crystal lattice filters for sideband selection.

Transceives with the R-4, R-4A, R-4B, R-4C and SPR-4 Receivers. Switch on the T-4XC selects frequency control by receiver or transmitter PTO or independently. Illuminated dial shows which PTO is in use.

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Controlled-carrier modulation for a-m is compatible with ssb linear amplifiers.

Automatic transmit-receive switching. Separate VOX time-delay adjustments for phone and cw. VOX gain is independent of microphone gain.

Choice of VOX or PTT. VOX can be disabled by front panel switch.

Adjustable pi network output.

Transmitting agc prevents flat-topping.

Meter reads relative output or plate current with switch on load control.

Built-in cw sidetone.

Spotting function for easy zero-beating.

Easily adaptable to RTTY, either fsk or afsk.

Compact size; rugged construction. Scratch resistant epoxy paint finish.

High Pass Filters for TV Sets

provide more than 40 dB attenuation at 52 MHz and lower. Protect the TV set from amateur transmitters 6-160 meters.

Drake TV-300-HP
For 300 ohm twin lead **$13**

Drake TV-75-HP
For 75 ohm TV coaxial cable; TV type connectors installed **$17**

$165

MN-4 (Model No. 1507)

$310

MN-2000 (Model No. 1509)

Drake MN-4 & MN-2000 Matching Networks

• **Integral Wattmeter** reads forward power in watts and VSWR directly; can be calibrated to read reflected power • **Matches 50 ohm transmitter output** to coax antenna feedline with VSWR of at least 5:1 • **Covers ham bands** 80 thru 10 meters • **Switches in or out** with front panel switch • **Size:** 5½"H, 10¾"W, 8"D (14.0 x 27.3 x 20.3 cm), MN-2000, 14⅜"D (36.5 cm).
• **Continuous Duty Output:** MN-4, 200 watts; MN-2000, 1000 watts (2000 watts PEP) • **MN-2000 only:** Up to 3 antenna connectors selected by front panel switch.

TVI Filters

Low Pass Filters for Transmitters

have four pi sections for sharp cut off below channel 2, and to attenuate transmitter harmonics falling in any TV channel and fm band. 52 ohm. SO-239 connectors built in.

Drake TV-3300-LP

1000 watts max. below 30 MHz. Attenuation better than 80 dB above 41 MHz. Helps TV i-f interference, as well as TV front-end problems. **$32**

Drake TV-5200-LP

200 watts to 52 MHz. Ideal for six meters. For operation below six meters, use TV-3300-LP or TV-42-LP. **$32**

Drake TV-42-LP

is a four section filter designed with 43.2 MHz cut-off and extremely high attenuation in all TV channels for transmitters operating at 30 MHz and lower. Rated 100 watts input.

$19

Prices shown include Tax

Write, 'phone or call for technical information.

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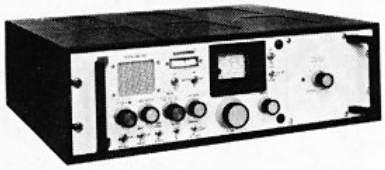
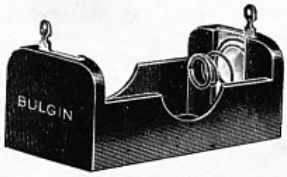
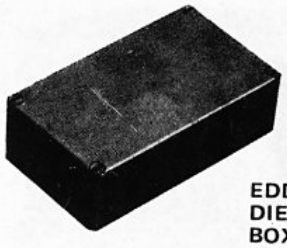
THE CHOICE OF AMATEURS AND PROFESSIONALS



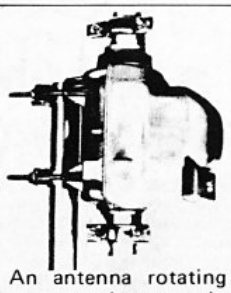
EDDYSTONE RECEIVERS
The word Eddystone is synonymous with quality communications receivers used throughout the world. 10 KHz to 870 MHz. (Send for a short form catalogue).



BULGIN BATTERY HOLDERS
In this day of battery operated equipment some device to hold batteries is essential from 1 to 3 cells in popular sizes.



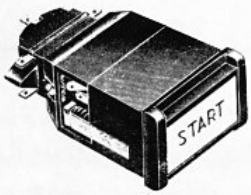
EDDYSTONE DIE CAST BOXES
6 Sizes
Made of diecast aluminium. Ideal for screened boxes or instrument cases.



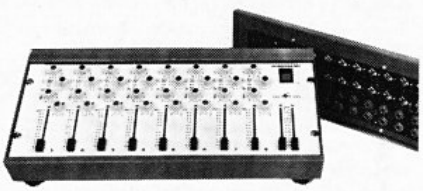
STOLLE ANTENNA ROTATOR
An antenna rotating device where the motor and support bearing are mounted on the antenna mast and the control unit on the equipment operating table.

SENNHEISER HEADPHONE/ MICROPHONE SET
Light (less than 10 oz.) and comfortable. Can be worn for long periods without fatigue. 'Open-Aire' headphones have frequency response of 20—20,000 Hz. Small, adjustable dynamic microphone, frequency response 50—12,000 Hz.

COAXIAL RELAY
Made by the DOW-KEY division of KILOVAC, the Model 77-223202 coaxial relay is a small, precision built unit despite its low cost.

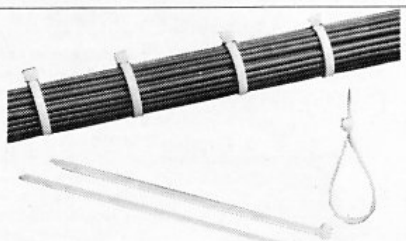


BULGIN SWITCHES
There is one for nearly every application, from instruments to control unit. Fully illustrated in the Bulgin catalogue available on request.



MILLBANK AMPLIFIERS AND MIXERS
A complete, integrated range of audio equipment from inputs through amplifiers to speakers, including plug-in pre-amps and mixers.

BULGIN FUSE HOLDERS
There is a Bulgin fuse holder for practically every type of installation including open, screw-in fuse cap, line cord, etc.



PANDUIT WIRING COMPONENTS
Cable harnesses must be tied, hung, mounted, identified and ducted. A full line catalogue is available upon request.

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Lead-acid, sealed, rechargeable batteries from 2 to 12 volts and up to 36 Amp-hour capacity. Ideal for transceivers.

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The Model MKH435T is a directional studio microphone with a cardioid pattern, a frequency response of 40—20,000 Hz, and built in pop filter.

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AR77

The Bulletin

DECEMBER 1977

W.A. SUPPLEMENT TO "AMATEUR RADIO"

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BULLETIN

All material for inclusion in The Bulletin to reach the Editors by Phone,on Air,or mail to Flat 74,50 Cambridge Street,,,,,, West Leederville,W.A. 6007 before 10th of each month.

L. A. B	VK6AN	3814531
J. BLAXENDALE	VK6JD	
A. BAXTER	VK-60213	4493335

CORRESPONDENCE

All other correspondence to be addressed to:-

Hon Secretary W.I.A. (W.A. Division)
P.O. Box N1002
PERTH
W.A. 6001

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GENERAL MEETING

Held on the THIRD TUESDAY of each month at 1945 hours at Science House, 710 Murray Street, West Perth.

COUNCIL MEETING

Held at the QTH of the Secretary, 388 Huntriss Road, Woodlands, on the LAST TUESDAY of each month at 1930 hours.

OBSERVERS WELCOME

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COUNCIL MEETING IN BRIEF - OCTOBER 1977

AMATEUR ADVISORY COMMITTEE

The idea of a volunteer Amateur Advisory Committee had not recieved a favourable reply from the Radio Branch.

DISPOSALS OFFICER

The Disposals Officer advised that a 2KVA portable Power Supply was available for emergency (W.I.C.E.N.) use and as its price was so reasonable ($20) it was approved for purchase.

J.O.T.A.

VK6An reported briefley on the J.O.T.A. and asked for any helpful hints or comments which could be applied to next years J.O.T.A.

W.I.C.E.N

The Deputy Net Controller commented briefley on the nationwide exercise codenamed "Exercise Backup".

CONTEST CERTIFICATES

VK6NK produced samples of the Annual Contest Certificates and plaques. It was decided to produce Maps of Shires for sale ($1.50 inc. postage or $1.00 at meetings). Work is proceeding on the Worked All Shires Award. Draft copies of the rules for the proposed City of Light 150 Year Contest were distributed to council for study prior to the next meeting at which an appropiate committee will be formed.

SUBSCRIPTIONS

VK6TU raised the question of an increase in next years subscriptions and an increase of 50c was decided on.

REPEATER

VK6NE asked about the W.A. Repeater Groups adherance to Australian Standards. VK6IQ replied with certain facts about deviation etc.

BROADCAST OFFICER

Some discussion took place regarding the position of Broadcast Officer and a committee was formed consisting of VK6IQ, VK6DY and VK6DA. It was proposed that the equipment for VK6WI should be suitably housed for easy handling to enable the gear to be kept together. VK6MA is to do the broadcast for the next three weeks followed by John Pritchard VK6IP and Mark Gaynor VK6ZEO.

SLOW MORSE PRACTICE

With the retirement of Kack Swiney early in November it was decided to await the outcome of the inaugral meeting of CW enthusiasts to see if there were any offers of operators.

AMATEUR OF THE YEAR AWARD

Nominations were discussed and a vote taken.

PARKERVILLE FIELD DAY

Ross asked what was to be done regarding euipment and volunteers for the Parkerville Field Day on December 3rd. but councillors expressed no desire to assist.

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RESULTS OF THE 1st. 3.5 MHz. SSB CONTEST

		Points	Rig	Ant	Power
1.	VK6NAG	88	TS 520	DP	35 PEP
2.	VK6NAY	80	-	-	-
3	VK6YL	44	FT101E	DP	200 PEP
4	VK6QI	41	TS 520	Inv. V	200 PEP
5	VK6NAO	38	Uniden 20 20	G5RV	30 PEP
6	VK6SP	36	FT101E	Inv DP	26) PEP
7	VK6QR	27	FT101B	Helical	200 PEP
8	VK6TU	19	-	-	-
9	VK6LV	16	FT101B	DP	150 PEP
10	VK6AN	15	-	-	-
11	VK6DC	11	-	-	-

Another very enjoyable contest although slightly dissapointing that more logs were not recieved. Many more stations than those listed above took part and it would have given us a better indication of the results if more logs had been handed in.

A suggestion is that we produce log sheets in the Bulletin for your use and wonder if this would be of assistance.

RESULTS OF THE 1st. VHF CONTEST

		Points	Rig	Ant	Power
1	VK6GR	4653	-	-	-
2	VK6QI	2732	TS700A FT101E QM70	4 Element 7 Element	
3	VK6ZHM	2450	-	--	-
4	VK6YL	1750	IC211 FT620	10 Eelemnt GP 6 Element	10W 10W

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COMMENTS ON THE CONTESTS

The first round of Annual Contests are over and checked with all comments duly noted such that when the 1978 Contest Dates are announced a few adjustments will be made.

The biggest controversety appears with the VHF Contest. This I feel is due to the non-publishing of the formulae and examples for working out of logs, so the few logs recieved have all been adjusted to the same formulae with the results as shown, this basically did not change the positions in the results.

Thank you to all those that entered or took part and we look forward to more interesting contests next year.

73's Cliff VK6NK

@@@

CHRISTMAS MESSAGE FROM THE PRESIDENT

As the Festive season draws near the temptation is very real to look back on the past twelve months and reflect on the events. Does it help?? Does it make us any wiser??. Faced with a similar set of circumstances in the future would we take a different approach??

The past 1977 has been a critical year for Amateur Radio Operators and for the Wireless Institute in general. There has been the formidable challange of the newly introduced Citizens Radio Service. Only the March of Time will reveal whether our submissions and attitude have been right or wrong. Hopefully what appear now as stumbling blocks will be converted to stepping stones to a happier future. Many of the present C.B. operators will, no, doubt, see the limitations of their service and step up to Amateur Radio, thus swelling our ranks and adding strength of numbers.

And what of the future? What advances to the state of the art will be made in 1978? The possibilities seem endless. Then there is our States 150th. Year celebration comming up in '79. with the much publicised W.A.R.C. Instant excitement,

On a more personal note, what does the new year hold for you? A new rig? A new shack? More DX certificates? More "home brew" projects?

May I take the opportunity of wishing you and yours a Merry Christmas and whatever you would wish yourself for the New Year.

Ross VK6DA

TO ALL W. I A. MEMBERS

A Merry Christmas

and a

Happy New Year

THE EDITORS